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LISTS OF SPECIES

Check List 11(6): 1807, 9 December 2015 doi: http://dx.doi.org/10.15560/11.6.1807
ISSN 1809-127X © 2015 Check List and Authors

Diversity and distribution of microlichens in the state of Arunachal Pradesh, Eastern Himalaya, India

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Abstract: The paper reports the occurrence of 404 species of microlichens belonging to 105 genera and 39 families known so far, from the state of Arunachal Pradesh, a part of the Himalaya biodiversity hotspot. Twelve species, namely *Arthopyrenia saxicola*, *Arthothelium subbessale, Diorygma macgregorii*, *D. pachygraphum*, *Graphis nuda*, *G. oligospora*, *G. paraserpens*, *G. renschiana*, *Herpothallon japonicum*, *Megalospora atrorubricans*, *Porina tijucana* and *Rhabdodiscus crassus,* are new distributional records for India. *Astrothelium meghalayense* (Makhija & Patw.) Pushpi Singh & Kr. P. Singh and *Astrothelium subnitidiusculum* (Makhija & Patw.) Pushpi Singh & Kr. P. Singh are proposed as new combinations and 66 species marked by an asterisk (*) are new distributional records for the state.

Key words: microlichens, diversity, Eastern Himalaya, new records

INTRODUCTION

The Indian state of Arunachal Pradesh, one of the most important parts of the Himalaya biodiversity hotspot (Mittermeier et al. 2005) covers an area of 83,743 km² (2.54 % total area of India) and is at altitudes ranging between 200 and 7,000 m above the mean sea level. Arunachal Pradesh lies between 26°28′ and 29°30′ N latitude and 091°30′ and 097°30′ E longitude. It harbours rich and unique diversity of lichen flora in northeastern India due to varied climate and topography. Various types of substrata, such as bark, twigs, leaves, soil, and rocks, provide suitable conditions for the rich growth of lichens from tropical to alpine regions. Lichenological exploration in the state was first made by Rolla Seshagiri Rao and Gopinath Panigrahi of Botanical Survey of India during 1956–1958. These collections were studied by Awasthi (1961) who reported 42 species of macrolichens. Subsequently, based on new collections in the state, some additional publications on foliicolous lichens, new species, and new records for India have been made (e.g., Pinokiyo et al. 2004; Dubey et al. 2007, 2010; Pinokiyo et al. 2008; Singh and Pinokiyo 2008; Singh and Swarnlatha 2011a, 2011b; Jagadeesh Ram and Sinha 2011; Upreti et al. 2011; Singh and Singh 2012a, 2012b, 2012c, 2014; Singh et al. 2013; Joshi et al. 2014). Recently, a publication on foliicolous lichens of India (Singh and Pinokiyo 2014) recorded 98 species from Arunachal Pradesh. However, the microlichens of upper northern regions of the state could not be fully explored because of rugged and inaccessible hilly terrain. In the present study, the microlichens collected so far, have been investigated, identified and enumerated together with published reports in the tabular form (Appendix, Table A1) for future users.

MATERIALS AND METHODS

Arunachal Pradesh borders the states of Assam and Nagaland to the south, and shares international borders with the countries of Myanmar in the east, Bhutan in the west, and Tibet (People's Republic of China) in the north. Several extensive collection expeditions were undertaken in different localities in the state (Figure 1). Collected specimens were deposited in the herbaria of Botanical Survey of India, Central Regional Centre, Allahabad (BSA), and Eastern Regional Centre, Shillong (ASSAM). Also studied were specimens loaned from the National Botanical Research Institute, Lucknow (LWG). Morphological observations were made using a stereomicroscope (Nikon SMZ 1500). Thin, hand-cut sections, of thalli and ascomata were mounted in water, lactophenol cotton blue (LPCB), 10% KOH and Lugol's iodine solution. All anatomical measurements were taken in water mounts and examined under a compound microscope (Nikon Eclipse 50i). Secondary metabolites were identified by thin layer chromatography (TLC) following Orange et al. (2001) and White and James (1985). All the specimens were identified with the help of authenticated specimens available in the various herbaria and published literature. Current names of the

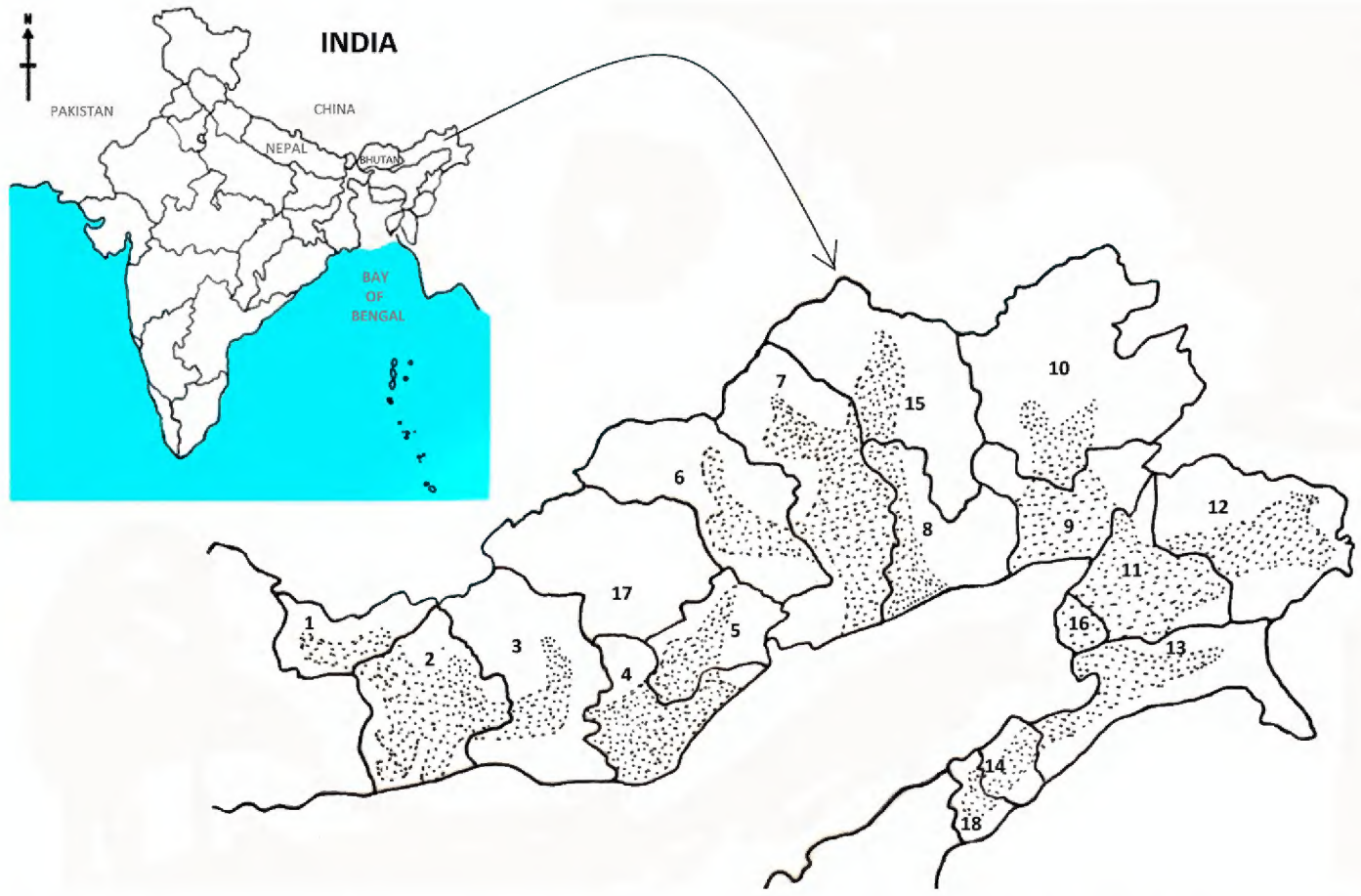


Figure 1. Map of Arunachal Pradesh showing areas of exploration (stippled) of microlichens in various districts.

species, habit and distribution in districts along with selected voucher specimen numbers are also provided.

RESULTS

This study of microlichens of Arunachal Pradesh revealed the occurrence of 404 species (Appendix, Table A1), belonging to 105 genera and 39 families (Figure 2), of which 12 species are newly recorded for the Indian lichen flora and 66 species (marked with an asterisk) are new distributional records for Arunachal Pradesh.

As far as the microlichen diversity is concerned, the family Graphidaceae comprises 123 species and shows maximum diversity, followed by Porinaceae (35 species), Pyrenulaceae (34 species), Pilocarpaceae (31 species), Arthoniaceae (30 species), Lecanoraceae (22 species), Physiaceae (16 species), Pertusariaceae (12 species), etc. At the generic level, *Graphis* comprises 46 species and shows maximum species diversity, followed by *Porina* 34 species and *Lecanora* 21 species.

New distributional records

Arthopyrenia saxicola A. Massal. *Symmict. Lich.*: 107. 1855. (Figure 3A–C)

Notes: This species is characterized by its saxicolous habit (on cemented rock), lichenized, superficial to endolithic, whitish or pale brownish or greyish thallus; black solitary ascomata, branched and anastomosing pseudoparaphyses with simple periphysoids; 8-spored asci; colorless, transversely 1-septate, 18–19 (–21) × 7–9 µm ascospores with upper cell slightly broader than the lower cell and lacking lichen substances. Sometimes this species is confused with *Porina linearis* (Leight.) Zahlbr., which has 3-septate ascospores and ± simple paraphyses (*fide* Orange 2013). Earlier, this species was erroneously

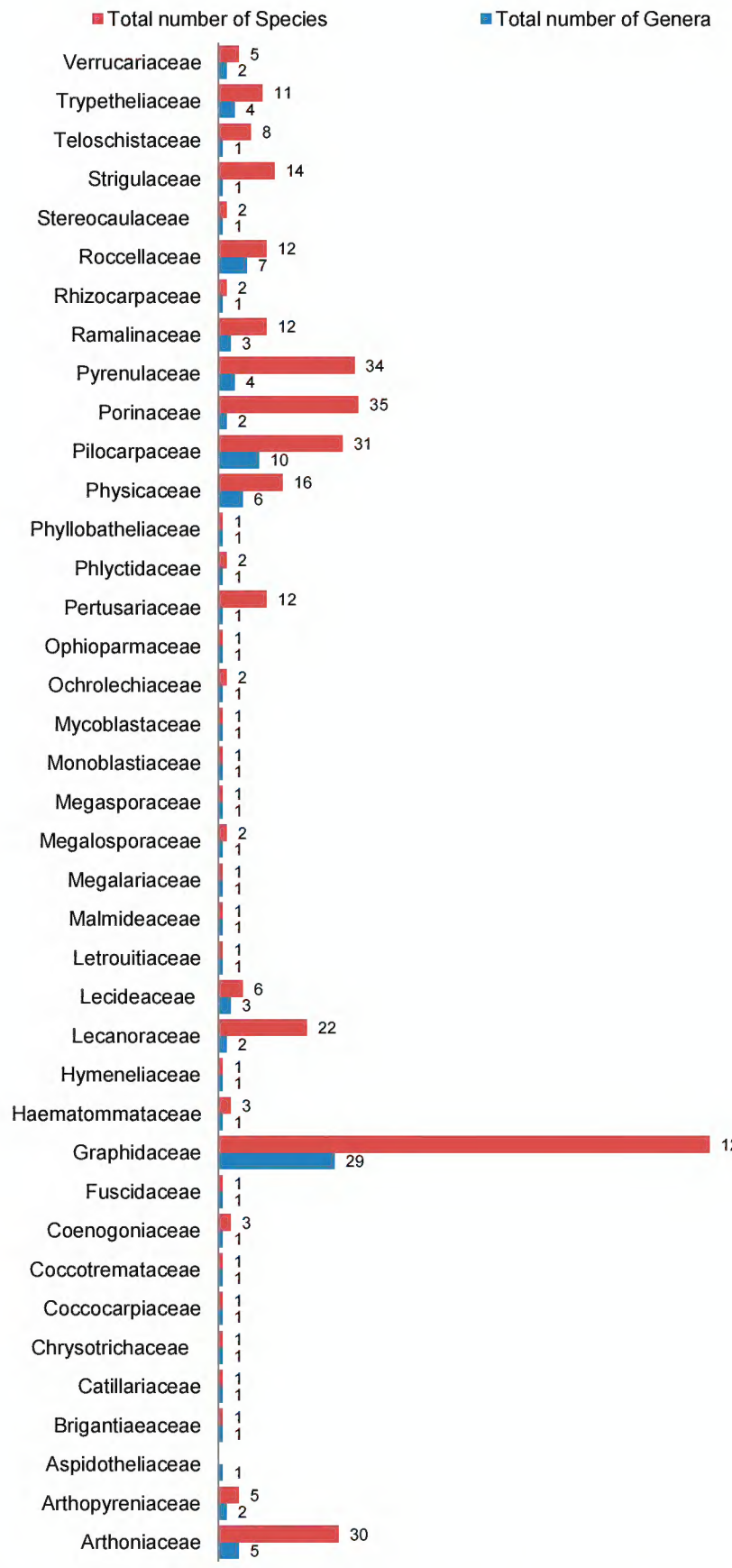


Figure 2. Total number of genera and species of per microlichen family in Arunachal Pradesh.

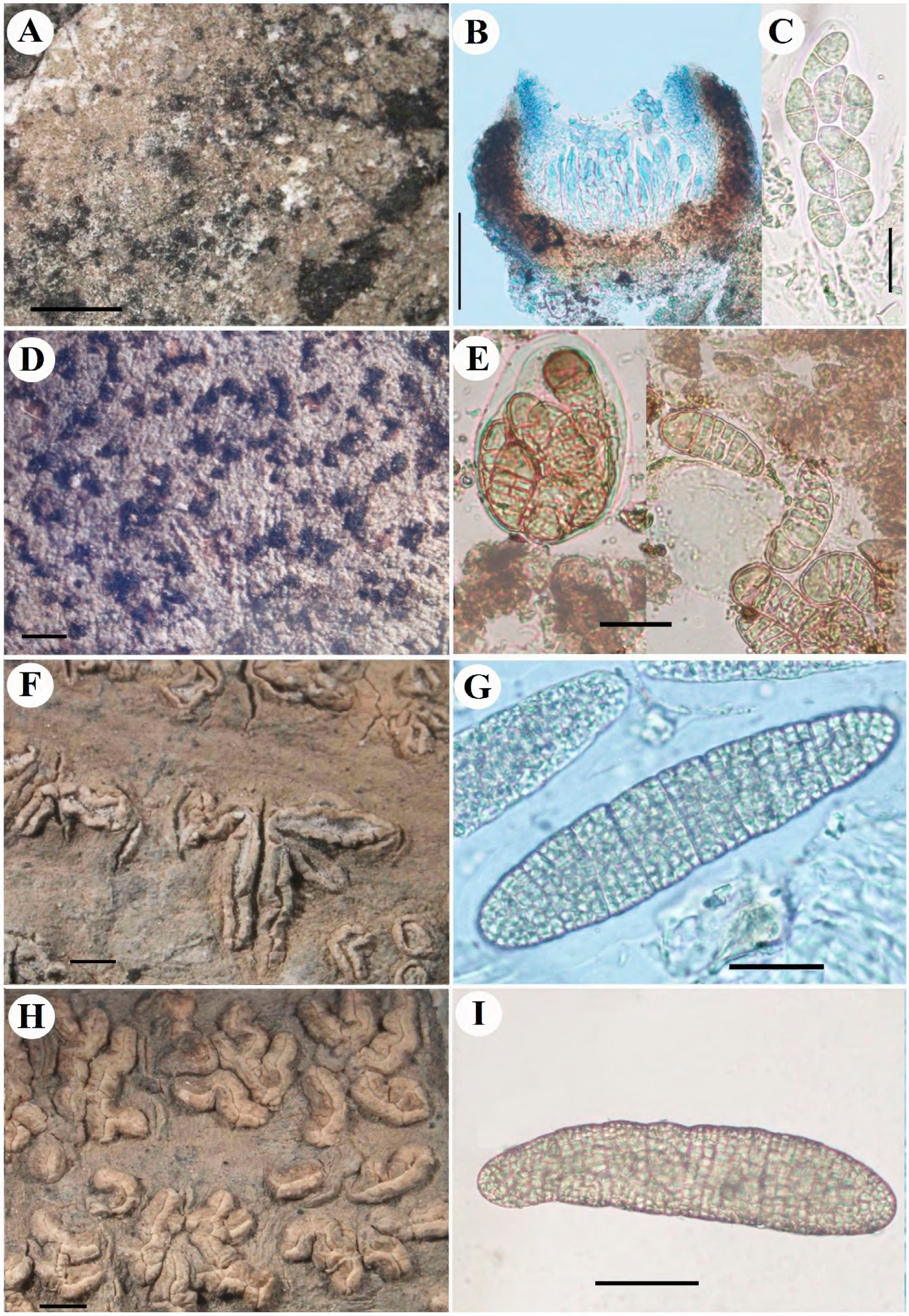


Figure 3. A–C: *Arthopyrenia saxicola,* (A) habit, (B) transverse section of ascoma, (C) ascus with ascospores. **D–E:** *Arthothelium subbessale*, (D) habit, (E) ascus and ascospores. **F–G:** *Diorygma macgregorii,* (F) habit, (G) ascospore. **H–I:** *D. pachygraphum,* (H) habit, (I) ascospore. Scale bars: A, D, F, H = 1 mm; B=100 µm; C, E=20 µm; G=25 µm; I=50 µm.

identified as *Anisomeridium calcicolum* Upreti & Nayaka (Pinokiyo et al. 2008). It grows between 300 and 400 m altitude in shady exposed places in tropical forests. The species is distributed in Britain, China, Ireland and Hong Kong.

Specimen examined: Arunachal Pradesh, Lower Debang Valley district, Mehao Wildlife Sanctuary, Sally Lake, on cemented stones, alt. 390–400 m, *K.P. Singh & P. K. Dixit* 476 (BSA).

Arthothelium subbessale (Nyl.) Makhija & Patw., *Tropical Bryology* 10: 210. 1995. *Arthonia subbessalis* Nyl., *Sert. Lich. Trop. Labuan Singapore*: 23. 1891
(Figure 3D–E)

Notes: *Arthothelium subbessale* is characterized by its endophloeodal to slightly epiphloeodal, irregular, brownish grey thallus; blackish-brown semi-immersed substellate to irregular, blackish-brown ascomata; branched and anastomosing paraphysiods; 8-spored asci; muriform, transversely 6–7-septate and longitudinally 1–3-septate, 30–35 (–36) × 14–16 µm ascospores with a large undivided apical cell and absence of lichen substances. In ascospores character, it closely resembles *Arthothelium bessale* (Nyl.) Zahlbr., which has rounded, large ascomata and large ascospores (36–44 µm long, *fide* Makhija and Patwardhan 1995). The species is distributed in Singapore.

Specimen examined: Arunachal Pradesh, Upper Subansiri district, Taliha, Subansiri River bed, on bark, *K.P. Singh* 10502 (ASSAM).

Diorygma macgregorii (Vain.) Kalb, Staiger & Elix, *Symb. Bot. Ups.* 34(1): 159–160. 2004. *Cyclographina macgregorii* (Vain.) D.D. Awasthi & M. Joshi, *Norw. J. Bot.* 26(3): 172. 1979.
(Figure 3F–G)

Notes: *Diorygma macgregorii* is characterized by its pale brown or grayish brown, rugose ecorticate thallus; straight to incurved, flexuous and branched, prominently raised lirellae; wide open whitish pruinose disc; divergent, non-carbonized exciple; clear, completely I+ blue hymenium; colorless, oblong, densely muriform, 110–180 × 40–50 µm ascospores and presence of norstictic and connorstictic acids. This species resembles *Diorygma pachygraphum* (Nyl.) Kalb, Staiger & Elix, but later species differs in having closed to slightly open disc and strongly raised apothecia. This species is widely distributed in China, Philippines and Papua New Guinea.

Specimens examined: Arunachal Pradesh, West Kameng district, near Dedza bridge, Bhaulkpong-Tenga road, on bark, alt. ca. 1216 m, *K.P. Singh & G. Swarnlatha* 4833, 4826 (BSA).

Diorygma pachygraphum (Nyl.) Kalb, Staiger & Elix, *Symb. Bot. Upsal.* 34 (1): 163. 2004. *Graphis pachygrapha* Nyl., Acta Soc. Sci. fenn. 7(2): 472. 1863.
(Figure 3H–I)

Notes: This species is characterized by its greenish or whitish grey slightly fissured to rimose ecorticate thallus; flexuous, elongated, prominently raised constricted lirellae; closed or slightly opened whitish pruinose disc; convergent to divergent, uncarbonized exciple; hyaline, weakly I+ blue-violet hymenium mostly in lateral part; 1-spored asci with large densely muriform, 164–195 × 34–50 µm ascospores and presence of norstictic and connorstictic acids. In chemistry and ascospores characters, it closely resembles *Diorygma macgregorii* (Vain.) Kalb, Staiger & Elix, which has whitish pruinose exposed disc. The species is distributed in China, Colombia, Philippines and Tanzania.

Specimens examined: Arunachal Pradessh, West Siang district, Basar to Bame, alt. ca. 850 m, *K. P. Singh* 2445 (ASSAM); West Kameng district, Bhalukpong-Tenga road, near Dedza Bridge, on bark, alt. ca. 1216 m, *K.P. Singh & G. Swaranlata* 4931, 4835, 4845, 4832 (BSA).

Graphis nuda (Magn.) Staiger & Lücking, in Lücking, Chaves, Sipman, Umaña & Aptroot, *Fieldiana Bot.* 38 (no. 1549): 93. 2008. *Graphina nuda* H. Magn., *Ark. Bot.* 3(no. 10): 266. 1955.
(Figure 4A–B)

Notes: This species is characterized by the greyish or whitish grey thallus; very short, sessile lirellae lacking thalline margin; concealed disc; entire labia; completely carbonized exciple; clear hymenium; 8-spored asci with colorless, muriform, 28–44 (–47) × 14–19 µm ascospores and absence of lichen substances. Morphologically, it closely resembles *Graphis ruiziana* (Fée) A. Massal., and *G. subruiziana* Sipman, Chaves & Lücking, but both later species have larger 35-65 µm and 55–80 µm long ascospores respectively (*fide* Lücking et al. 2009) ascospores. The species is widely distributed in Neotropics and Eastern Palaeotropics.

Specimen examined: Arunachal Pradesh, Lower Dibang Valley district, Mehao Wildlife Sanctuary, Sally lake, on bark, alt. 390-400 m, *K.P. Singh & P.K. Dixit* 448 (BSA).

Graphis oligospora Zahlbr. apud Handel-Mazzetti, *Symbol. Sinic. Pars* 3: 45. 1930.
(Figure 4C–D)

Notes: This species is characterized by its pale brown, rugose thallus; short and sparsely branched, emergent lirellae covered with lateral thalline margin; concealed disc; entire labia; apically to peripherally carbonized exciple; clear hymenium; 2–4 (–6)-spored asci with colorless, fusiform, transversely 8–10-septate, (26–) 36–42 × (7–) 8–10 µm ascospores and absence of lichen substances. Anatomically, it closely resembles *Graphis*

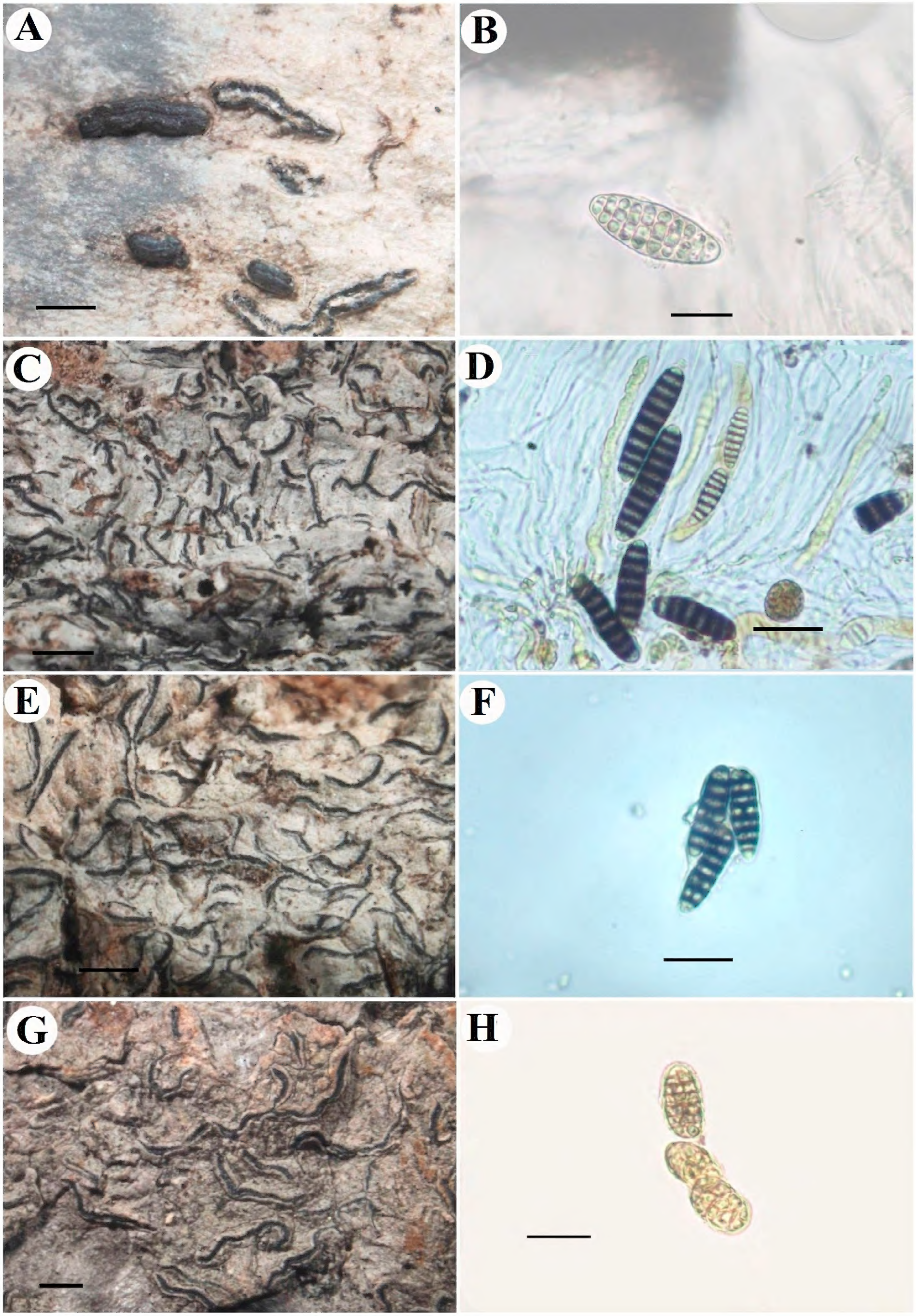


Figure 4. A–B. *Graphis nuda,* (A) habit, (B) ascospore. **C–D:** *G. oligospora,* (C) habit, (D*)* ascospores. **E–F:** *G. paraserpens,* (E) habit, (F) ascospores. **G–H:** *G. renschiana,* (G) habit, (H) ascospores. Scale bars: A, C, E, G = 1 mm; B, D, F, H = 20 µm.

intermediella Stirt., which has very long and radiately branched lirellae. The species is widely distributed in eastern palaeotropics.

Specimen examined: Arunachal Pradesh, Lower Dibang Valley district, Mehao Wildlife Sanctuary, Mehao lake, on bark, alt. 1550-1600 m, *K.P. Singh & P. Barua* 10871 (ASSAM).

Graphis paraserpens Lizano & Lücking, in Lücking, Chaves, Sipman, Umaña & Aptroot, *Fieldiana Bot.* 38 (1549): 96. 2008.
(Figure 4E–F)

Notes: *Graphis paraserpens* is characterized by its greyish brown to pale brown thallus; elongate, straight to flexuose, partly branched, immersed-erumpent lirellae with concealed disc and striate labia; apically to peripherally carbonized exciple with apically thin complete thalline margin; 2–6-spored asci with colorless, muriform, 22–35 × 8.5–10 µm ascospores and absence of lichen substances. Morphologically, it resembles *Graphis symplecta* Nyl., which has broader ascospores (15–20 µm, *fide* Lücking et al. 2009). It also closely resembles *Graphis puiggarii* (Müll. Arg.) Lücking in morphological characters and ascospores size but the latter species differs in having lateral carbonized exciple. The species is distributed in Costa Rica.

Specimen examined: Arunachal Pradesh, West Kameng district, Sessa, on bark, alt. 1110-1500 m, *Pinokiyo* 64 (BSA).

Graphis renschiana (Müll. Arg.) Stizenb., *Bericht. Uber die Thatigk. St. Gallisch. Naturw. Gesellsch.* 184. 1891. *Graphina renschiana* Müll. Arg., *Flora Regensburg* 68(28): 512. 1885.
(Figure 4G–H)

Notes: This species is characterized by its greyish brown to reddish brown thallus; elongate and irregularly branched, erumpent lirellae with concealed disc and entire labia; laterally carbonized exciple; clear hymenium; 4–6-spored asci with colorless, muriform, 22–35 × 10–15 µm ascospores and presence of norstictic acid. Morphologically and in chemistry, it resembles *Graphis norstictica* A.W. Archer & Lücking and *G. borealis* (A.W. Archer) A.W. Archer, but both latter species have larger ascospores. Morphologically, it also resembles *G. deserpens* Vain, which has stictic acid. This species is widely distributed in China, Florida, Madagascar and the Philippines (Pantropical).

Specimen examined: Arunachal Pradesh, West Kameng district, Tipi, Festival ground, on bark, alt. ca. 160 m, *K.P. Singh* & G. *Swarnlatha* 4741 (BSA).

Herpothallon japonicum (Zahlbr.) G. Thor *in* Aptroot et al. *Biblioth. Lichnol.* 99: 44. 2009. *Chiodecton japonicum* Zahlbr., *Annals mycol.* 29(1/2): 77. 1931.
(Figure 5A–B)

Notes: This species is characterized by the whitish to greenish-grey, minutely felty thallus lacking calicium oxalate crystals, I-/KI-; numerous, dense, cylindrical, unbranched, byssoid-felty, 0.8–1 × 0.2 mm pseudoisidia; whitish byssoid hypothalllus; pale brown to whitish byssoid prothallus and presence of gyrophoric acid as major substance. It closely resembles *H. philippinum* (Vain.) Aptroot & Lücking in morphology but later species differs in I+/KI+ blue reaction and presence of calicium oxalate crystals in the thallus. Earlier this species was reported from Japan.

Specimen examined: Arunachal Pradesh, East Kameng district, Phakui Wildlife Sanctuary, Dichu-Julley Nala, on bark, alt. 300-400 m, *K. P. Singh* 10091 A, B (ASSAM).

Megalospora atrorubricans (Nyl.) Zahlbr. *Cat. Lich. Univ.* 4: 86. 1927. *Lecidea marginiflexa* var. *atrorubricans* Nyl., *Flora Regensburg* 49: 132. 1866.
(Figure 5C–D)

Notes: This species is characterized by its greyish green, rugulose thallus; sessile, concave to strongly convex, dark brown to black, epruinose apothecia; inspersed hymenium; brown epihymenium; 1-spored asci with colorless, ellipsoid to oblong, straight, transversely 1-septate, 88–102 × 30–35 µm ascospores and presence of usnic acid and zeorin. In ascospores character and chemistry, it closely resembles *Megalospora sulphurata* Meyen, which has 2–8-spored asci and ±curved (*sulphurata*-type) ascospores. This species is widely distributed in the Hawaiian Islands, Indonesia, the Mascarene Islands, Papua New Guinea, the Philippines and New Caledonia.

Specimen examined: Arunachal Pradesh, West Kameng district, Shergoan river side, on bark, alt. ca. 1,600 m, *G.P. Sinha & T.A.M. Jagadeesh Ram* 11416 (ASSAM).

Porina tijucana Vain., *Étude Lich. Brésil* 2: 220. 1890.
(Figure 5E–F)

Notes: *Porina tijucana is* characterised by its saxicolous habit, grey brown to greenish brown thallus; emergent 0.3–0.65 µm diam. perithecia with broad black perithecial cap; well-developed involucrellum and fusiform, transversely 5–9 (–11)-septate, 69–80 × 8.5–10 (–13) µm ascospores with gelatinous sheath. It resembles *P. guaranitica* Malme, which has a highly reduced involucrellum. It is also close to *P. mastoidea* (Ach.) Müll. Arg., but later species differs in having smaller ascospores (32–65 × 6–12 µm, *fide* McCarthy 2001). The species is widely distributed in Brazil, Costa Rica, Colombia, Panama and Thailand.

Specimens examined: Arunachal Pradesh, Dibang Valley district, Ryali-Anini forest, on rock, alt. ca. 900 m, *K. P. Singh* 4783 (ASSAM); Lower Subansiri district, Yazali river side forest, on rock, alt. 480–494 m, *K. P.*

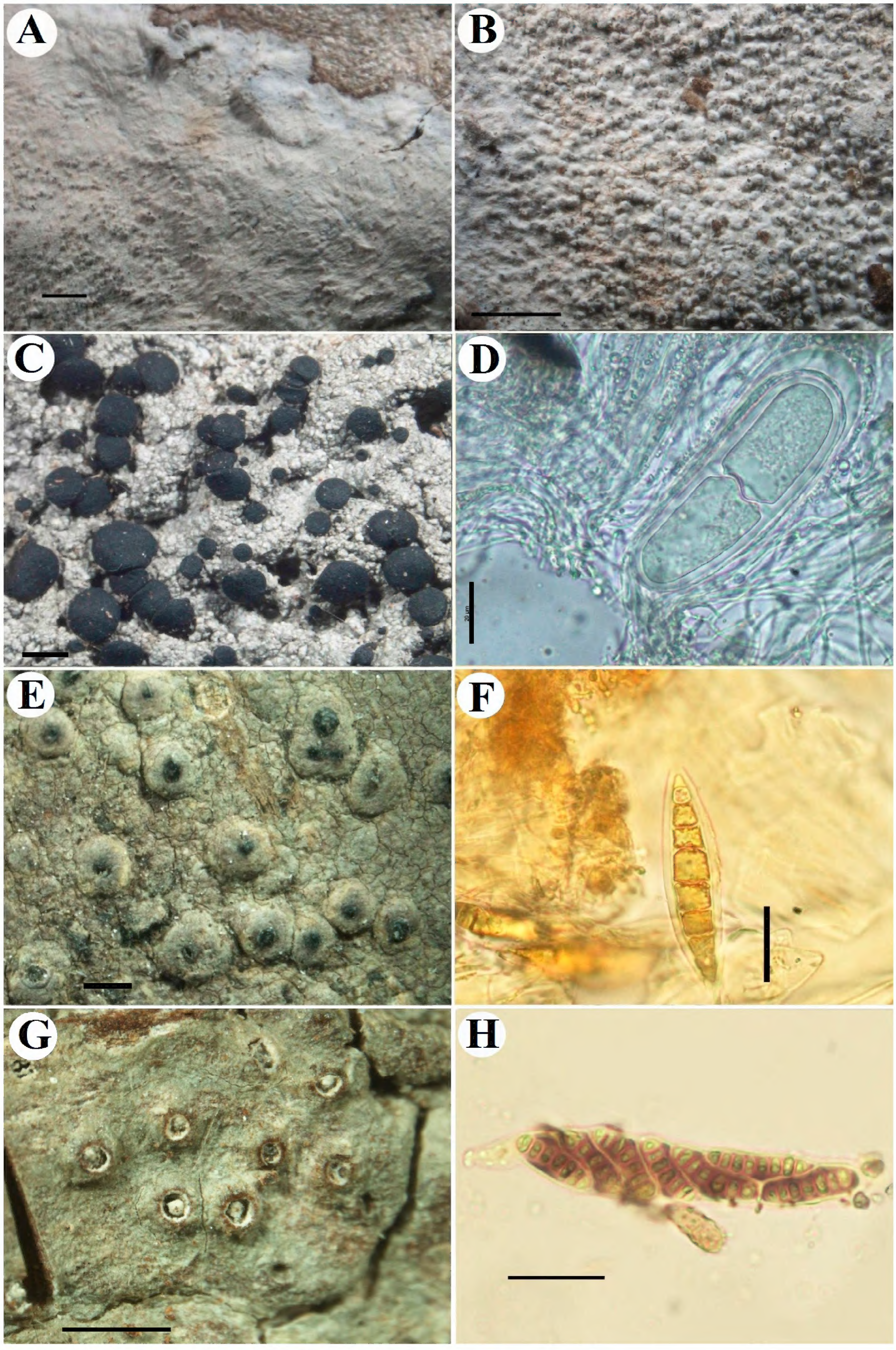


Figure 5. A–B. *Herpothallon japonicum*, (A) habit, (B) pseudoisidia (close-up). **C–D:** *Megalospora atrorubricans,* (C) habit, (D) ascus with ascospore. **E–F:** *Porina tijucana,* (E) habit, (F) ascospore. **G–H:** *Rhabdodiscus crassus* (G) habit, (H) ascospores. Scale bars: A, B, C, E, G = 1 mm; D, H= 20 µm; F= 25 µm.

Singh 5547 (ASSAM).

Rhabdodiscus crassus (Müll. Arg.) Rivas Plata, Lücking & Lumbsch, *Taxon* 61. 1175. 2012. *Leptotrema crassum* Müll. Arg., Flora, Regensburg 65(21): 332. 1882.
(Figure 5G–H)

Notes: This species is characterized by its greenish grey to brownish thallus; emergent to prominent apothecia with broad-stump shaped carbonized columella with whitish pruinosity at the tip and open disc; lateral carbonized exciple with clear hymenium; 8-spored asci with fusiform, 5–7 × 0–1-septate, 15–20 × 7–9 µm ascospores and presence of psoromic acid (major). Morphologically, it closely resembles *Ocellularia papillata* (Leighton) Zahlbr., which has a simple columella, 3–5-septate ascospores and lacks psoromic acid. The species is widely distributed in Australia, Costa Rica, Indonesia (Java), Japan and USA.

Specimen examined: Arunachal Pradesh, Lower Dibang Valley district, Mehao Wildlife Sanctuary, Mehao lake, alt. ca. 1,550 m, *K.P. Singh & P.K. Dixit* 547 C, F (BSA).

New combinations

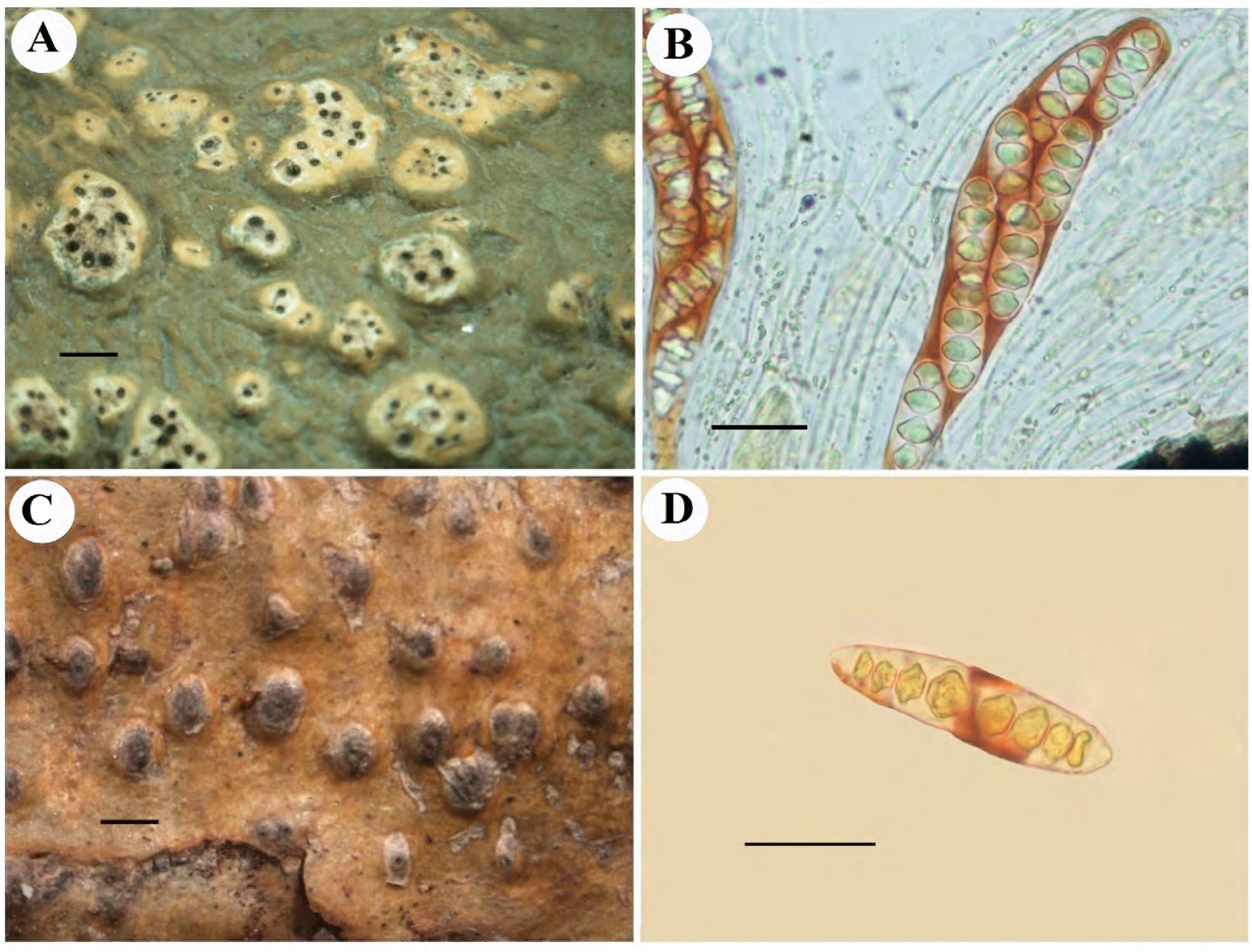
Recently, phylogenetic studies on Trypetheliaceae (Nelsen et al. 2014) have shown that the species with rounded (not diamond-shaped) lumina in ascospores cluster around the *Trypethelium* group, while species with diamond-shaped lumina form another cluster around the *Astrothelium conicum*-group, regardless of their ascoma organization. Accordingly following two new combinations are proposed.

Astrothelium meghalayense (Makhija & Patw.) Pushpi Singh & Kr. P. Singh comb. nov.; *Trypethelium meghalayense* Makhija & Patw., *J. Hattori Bot. Lab.* 73: 201.1993.
(Figure 6A–B)
Mycobank: MB 814410

Notes: *Astrothelium meghalayense* is characterized by its greenish grey thallus; multicarpic, thallus colored, raised pseudostromata with creamish colored top; inspersed hamathecium; 8-spored asci and colorless, transversely 3-septate, 23–30 × 7–9 µm ascospores with diamond-shaped lumina.

Specimen examined: Arunachal Pradesh, Lower Dibang Valley district, Mehao Wildlife Sanctuary, Mehao Lake, on bark, alt. 1,550–1,700 m, *K. P. Singh & P. K. Dixit* 589 E (ASSAM).

Astrothelium subnitidiusculum (Makhija & Patw.) Pushpi Singh & Kr. P. Singh comb. nov.; *Trypethelium*



Figures 6. A–B: *Astrothelium meghalayense,* (A) habit, (B), ascus with ascospores. **C–D:** *Astrothelium subnitidiusculum,* (C) habit, (D) ascospore. Scale bars: A, C = 1 mm; B, D = 20 µm.

subnitidiusculum Makhija & Patw., *J. Hattori Bot. Lab.* 73: 207. 1993.
(Figure 6C–D)
Mycobank: MB 814411

Notes: *A. subnitidiusculum* is characterized by its brownish-yellow thallus; monocarpic, thallus colored, raised pseudostromata with pale top; inspersed hamathecium; 8-spored asci and colorless, transversely 7-septate, 30–58 × 10–13 µm ascospores with diamond-shaped lumina.

Specimen examined: Arunachal Pradesh, Namsai district, Madhuban Reserve Forest, alt. ca. 250 m, *K.P. Singh* 4196 (ASSAM).

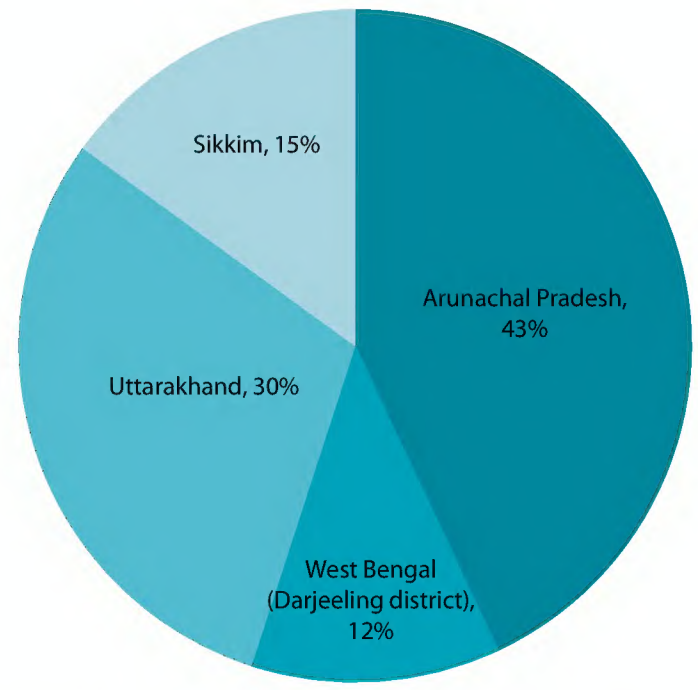


Figure 7. Microlichen diversity in Indian Himalayan states.

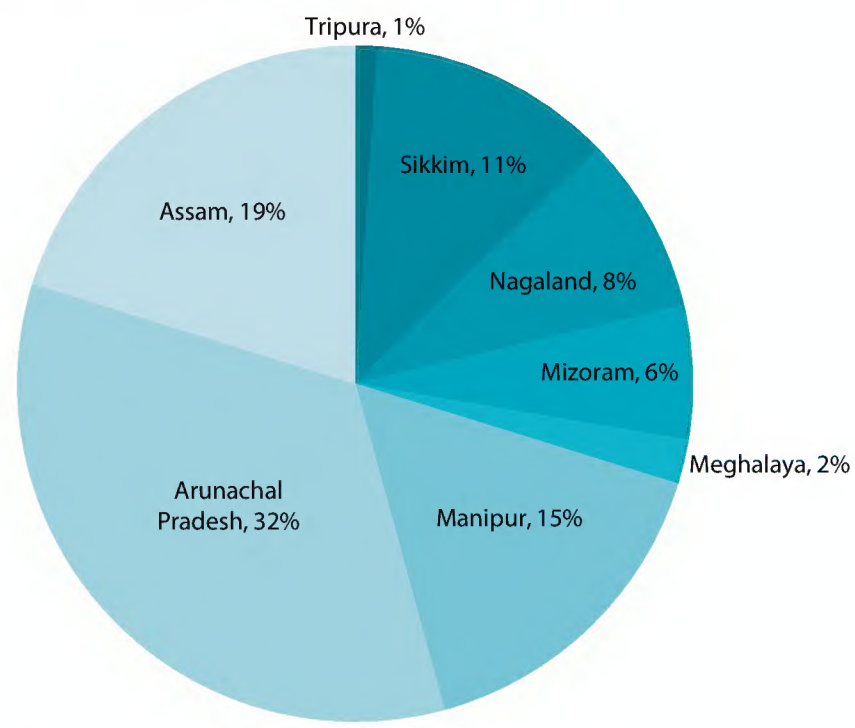


Figure 8. Microlichen diversity in northeastern states of India.

DISCUSSION

Geographically, Arunachal Pradesh is the largest state among the eight northeastern states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura) of India and harbours a wide spectrum of lichen diversity. The present study provides an idea of the diversity and distribution of microlichens in the state and provides baseline data for future research in this region. Arunachal Pradesh has characteristic lichen genera such as *Coccotrema* (Singh and Singh 2012c), *Erythrodecton* (Singh et al. 2009) and *Mycoblastus* (Singh and Singh 2015), which are hitherto unknown from the other parts of India. Forty-eight species (marked with an "E" in Appendix, Table A1) are endemic to India. Thus, Arunachal Pradesh has a distinct and unique lichen diversity and justifies its inclusion as a hotspot of biodiversity in the Indian Himalaya. Habitat-wise, 265 species are corticolous (67%), 98 species are foliicolous (25%), 27 species are saxicolous (7%), and four species are terricolous (1%). It is observed that the corticolous and foliicolous species are dominant and commonly distributed in almost all localities where as saxicolous and terricolous ones are scarce.

A comparison of microlichen diversity with other Indian Himalayan states indicates that the Arunachal Pradesh has the highest number of microlichen species known so far (Figure 7). The state has 404 species, but Uttarakhand has 282 species, Sikkim has 265 species, Himachal Pradesh has 155 species, Jammu and Kashmir has 149 species, and West Bengal-Darjeeling has 114 species (Singh and Sinha 2010; Upreti et al. 2010; Sinha and Jagadeesh Ram 2011; Jagadeesh Ram and Sinha 2011a, 2011b; Joseph and Sinha 2012, 2015; Goni et al. 2015). Similarly, a comparison among the north eastern states the Arunachal Pradesh also shows high percentage of microlichen diversity (Figure 8).

The rugged, hilly, and largely inaccessible terrain, which is cut by many rivers and streams originating from higher Himalayas, has made lichen surveys in the region extremely difficult. As a result, many areas in the north at higher elevations are still lichenologically unexplored; future exploration of these areas may provide many interesting finds. The present assessment of microlichens will be helpful in biomonitoring and climate change studies, conservation research, and sustainable utilization of lichen resources.

ACKNOWLEDGEMENTS

The authors thank Dr. Paramjit Singh, Director, Botanical Survey of India, Kolkata, for encouragement and Dr. G.P. Sinha, Head of Office, Botanical Survey of India, Central Regional Centre, Allahabad for facilities. One of the authors (PS) also thanks the authorities of Botanical Survey of India for financial assistance under the "Flora of India Project".

LITERATURE CITED

Awasthi, D.D. 1961. Some foliose and fruticose lichens from Assam and North-East Frontier Agency of India. Proceedings of the Indian Academy of Sciences, Section B, 54: 24–44.

Dubey, U., D.K. Upreti and J. Rout. 2007. Lichen flora of Along, West Siang district, Arunachal Pradesh. Phytotaxonomy 7: 21–26.

Dubey, U., D.K. Upreti and N. Sanjeeva. 2010. A new species of *Leiorreuma* Eschw. from India. The Lichenologist 42: 711–713. doi: 10.1017/S002428291000040X

Goni, R., A.K.P. Raina, R. Magotra and N. Sharma. 2014. Lichen

flora of Jammu and Kashmir State, India: An updated checklist. Tropical Plant Research 2(1): 64–71.

Jagadeesh Ram, T.A.M. and G.P. Sinha. 2011. A new species and a new record of *Herpothallon* (lichenized Ascomycota) from India. Mycotaxon 116: 313–316. doi: 10.5248/116.313

Jagadeesh Ram, T.A.M. and G.P. Sinha. 2011a. Additional records of lichens for Darjeeling hills. Annals of Foresty 19(2): 264–265.

Jagadeesh Ram, T.A.M. and G.P. Sinha. 2011b. Additions to lichen flora of Himalaya from Darjeeling and Sikkim. Geophytology 40(1–2): 21–28.

Joseph, S. and G.P. Sinha. 2012. *Lecanora bicincta* Ramond, a new record to Indian lichen flora and some additions to the lichen flora of Sikkim, India. Geophytology 42(1): 71–75.

Joseph, S. and G.P. Sinha. 2015. Contributions to the genus *Synarthonia* (lichenized Ascomycota, Arthoniaceae). The Lichenologist 47(2): 123–130. doi: 10.1017/s002428291500002x

Joshi, Y., T.A.M. Jadageesh Ram, P. Singh and G.P. Sinha. 2014. *Caloplaca indica,* a new lichenized Ascomycetes (Teloschistaceae) from Eastern Himalaya, India. National Academy Science Letter 37(6) 517–519. doi: 10.1007/s40009-014-0270-3

Lücking, R., A.W. Archer and A. Aptroot. 2009. A world wide key to the genus *Graphis* (Ostropales: Graphidaceae). The Lichenologist 41: 363–452. doi: 10.1017/S0024282909008305

Makhija, U. and P.G. Patwardhan. 1995. The Lichen genus *Arthothelium* (Family Arthoniaceae) in India. Journal, Hattori Botanical Laboratory 78: 189–235.

McCarthy, P.M. 2001. *Porina*; pp. 106–153, in: P.M. McCarthy (ed.). Flora of Australia. 58A, Lichens 3. Canberra: Australia Government Publishing Service.

Mittermeier, R.A., P.R. Gil, M. Hoffman, J. Pilgrim, T. Brooks, C.G. Mittermeier, J. Lamoreux and G.A.B. de Fonseca (eds). 2005. Hotspots revisited: Earth's biologically richest and most endangered terrestrial ecoregions. Mexico: CEMEX. 392 pp.

Nelsen, M.P., R. Lücking, A. Aptroot, C.J. Andrew, M.E.S. Cáceres, E. Rivas Plata, C. Gueidan, L. DA Silva Canez, A. Knight, L.R. Ludwig, J. Mercadi-Diaz., S. Parnmens and H.T. Lumbsch. 2014. Elucidating phylogenetic relationships and genus-level classification within the fungal family Trypetheliaceae (Dothideomycets: Ascomycota). Taxon 65: 974–992.

Orange, A. 2013. British and other pyrenocarpous lichens. Cardiff, Wales: Department of Biodiversity and Systematic Biology, National Museum of Wales. 250 pp.

Orange, A., P.W. James and F. J. White. 2001. Microchemical Methods for the Identification of Lichens. London: British Lichen Society. 101 pp.

Pinokiyo, A., K.P. Singh and S.K. Borthakur. 2004. Foliicolous species of *Porina* (Lichens) from Arunachal Pradesh, India. Indian Journal Forestry 27(4): 407–416.

Pinokiyo, A., K.P. Singh and J.S. Singh. 2008. Diversity and distribution of lichens in relation to altitude in a protected area within a biodiversity hot spot of North-east India. The Lichenologist 40(1): 47–62. doi: 10.1017/S0024282908007214

Singh, K.P. and A. Pinokiyo. 2008. New taxa of lichens from eastern India. The Lichenologist 40(1): 23–29. doi: 10.1017/S0024282908006889

Singh, K.P. and A. Pinokiyo. 2014. Foliicolous lichens of India. Dehradun: Bishen Singh Mehendra Pal Singh. 335 pp.

Singh, K.P. and G. Swarnlatha. 2011a. A new species of *Schistophoron* from India. The Lichenologist 43(3): 209–212. doi: 10.1017/S0024282910000800

Singh, K.P. and G. Swarnlatha. 2011b. A note on Graphidaceous lichens from Arunachal Pradesh. Indian Journal Forestry 34: 353–360.

Singh, K.P. and G.P. Sinha. 2010. Indian lichens: Annotated Checklist. Kolkata: Botanical Survey of India. 571 pp.

Singh, K.P. and P. Singh. 2012a. A new species of *Pyrgillus* from India. The Lichenologist 44(6): 773–776. doi: 10.1017/S002428291200028X

Singh, K.P. and P. Singh. 2012b. Genus *Pyrgillus* Nyl. (Lichenized: Ascomycota: Pyrenulaceae) in India. Taiwania 57(4): 391–395.

Singh, K.P., T.A.M. Jagadeesh Ram and G.P. Sinha. 2009. *Erythrodecton* G. Thor (Lichenized Ascomycetes), a new generic record for India. Indian Journal Forestry 32(2): 335–336.

Singh, P. and K.P. Singh. 2012c. *Coccotrema* (Lichenized: Ascomycota) a new generic record for India. Indian Journal Forestry 35(1): 131–132.

Singh, P. and K.P. Singh. 2014. *Cyphelium inquinans* (Sm.) Trev. (lichenized: Ascomycota): a new record for India. Check List 10(1): 178–179. doi: 10.15560/10.1.178

Singh, P. and K.P. Singh. 2015. *Mycoblastus* Norman (Mycoblastaceae): A new generic record for India from Arunachal Pradesh. Indian Journal of Forestry 38(3): 249–251.

Singh, P., K.P. Singh and A.B. Bhatt. 2013. New species and new records of thelotremoid Graphidaceae (lichenized Ascomycota) from Arunachal Pradesh (India). Taiwania 58(4): 246–250. doi: 10.6165/tai.2013.58.246

Sinha, G.P. and T.A.M. Jagadeesh Ram. 2011. Lichen diversity in Sikkim; pp. 13–29, in: M.L. Arrawatia and S. Tambe (eds.). Biodiversity of Sikkim exploring and conserving a global hotspot. Gantok: Department of Information and Public Relations, Government of Sikkim.

Upreti, D.K., S. Nayaka and S. Chatterjee. 2010. Lichen diversity of Uttarakhand Himalaya; pp. 79–196, in: P.L. Uniyal, B.P. Chamola and D.P. Semwal (eds.). The plant wealth of Uttarakhand. New Delhi: Jagdamba Publishing.

Upreti, D.K., U. Dubey and N. Sanjeeva. 2011. A new isidiate species of *Hemithecium* Trevis. (Ascomycota, Graphidaceae) from India. The Lichenologist 43(5): 483–485. doi: 10.1017/S0024282911000430

White F.J. and P.W. James. 1985. A new guide to microchemical techniques for the identification of lichen substances. British Lichen Society Bulletin 57(Suppl.): 1–41.

Author contributions: KPS collected the specimens, PS and KPS did identification and photography and wrote the text and ABB attended the review processes.

Received: 2 July 2015
Accepted: 16 September 2015
Academic editor: Sandra Costa-Böddeker

APPENIDX.

Table A1. List of microlichens of Arunachal Pradesh, India. Abbreviations: + Present; C, corticolous; F, foliicolous; S, saxicolous; T, terricolous; E, endemic.

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subunsiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
Aderkomyces albostrigosus (R. Sant.) Lücking, Sérus. & Vězda	Graphidaceae	CF		2500–2750										+							397B (BSA)
Anisomeridium biforme (Borrer) R.C. Harris	Monoblastiaceae	C		ca. 1600					+												10561, 10569 (ASSAM)
Anthracothecium prasinum (Eschw.) R.C. Harris	Pyrenulaceae	C		300–400				+													10021 (ASSAM)
Anthracothecium macrosporum (Hepp) Müll. Arg.	"	C		200–700	+			+			+	+		+					+		2835, 9620 (ASSAM)
Arthonia antillarum (Fée) Nyl.	Arthoniaceae	C		ca. 400																	474B (BSA)
Arthonia cinnabarina (DC.) Wallr.	"	C		1000–1200					+	+				+							10309, 10665 (ASSAM)
Arthonia collectiva Stirt.	"	C		–							+										Dubey et al. 2007
Arthonia inconspicua Stirt.	"	C		ca. 250												+					4233 (ASSAM)
Arthonia palmulacea (Müll. Arg.) R. Sant.	"	F		200–800				+	+	+	+							+			12410A (ASSAM)
Arthonia recedens Stirt.	"	C	E	390–400			+							+							592A, 514 (BSA)
Arthonia subgyrosa Nyl.	"	C		300–400							+										Dubey et al. 2007
Arthonia trilocularis Müll. Arg.	"	F		200–800				+			+				+			+			12706E (ASSAM)
Arthonia sp. 1	"	C		400–500				+													2939, 2945 (ASSAM)
Arthonia sp. 2	"	C		ca.1800																+	9941 (ASSAM)
Arthopyrenia clavaeformis (Stirt.) D. Hawksw.	Arthopyreniaceae	C	E	350–850					+												3023 (ASSAM)
Arthopyrenia grisea (Schleich. ex Schaer.) Körb.	"	C		ca. 300					+												3047 (ASSAM)
**Arthopyrenia majuscula* (Nyl.) Zahlbr.	"	C		ca. 202			+														5195 (BSA)
Arthopyrenia saxicola A. Massal.	"	S		390–400										+							476 (BSA)
**Arthothelium abnorme* (Ach.) Müll. Arg.	Arthoniaceae	C		115–200			+	+													10120, 10165 (ASSAM)
Arthothelium chiodectoides (Nyl.) Zahlbr.	"	C		–							+										Dubey et al. 2007
Arthothelium subbessale (Nyl.) Makhija & Patw.	"	C		600–800					+												10502 (ASSAM)
Arthothelium sp. 1	"	C		1350–1500				+													9874 (ASSAM)
Aspicilia dwaliensis Räsänen	Hymeneliaceae	S	E	ca. 2400										+							508B (BSA)
Aspidothelium scutellicarpum Lücking var. *indicum* Kr.P. Singh & Pinokiyo	Aspidotheliaceae	F	E	1600–800											+			+			12972E (CAL)
Asterothyrium decipiens (Rehm) R. Sant.	Graphidaceae	F		500–600				+													12856D (ASSAM)
Asterothyrium rotuliforme (Müll. Arg.) Sérus.	"	F		1100–1200				+	+												12864D (ASSAM)
Astrothelium meghalayense (Makhija & Patw.) Pushpi Singh & Kr. P. Singh	Trypetheliaceae	C	E	1550–1700										+							589E (BSA)
Astrothelium subnitidiusculum (Makhija & Patw.) Pushpi Singh & Kr. P. Singh	"	C	E	ca. 250																+	2676 (ASSAM)
Aulaxina quadrangula (Stirt.) R. Sant.	Graphidaceae	F		200–300															+		11819C (ASSAM)
Aulaxina uniseptata R. Sant.	"	F		550–950					+												12850D (ASSAM)
**Bacidia heterochroa* (Müll. Arg.) Zahlbr.	Ramalinaceae	C		ca. 400								+									2912 (ASSAM)
**Bacidia laurocerasi* (Delise ex Duby) Vain.	"	C		300–600										+							4029 (BSA)
**Bacidia medialis* (Tuck. ex Nyl.) Zahlbr.	"	C		1100–1200			+														11282 (ASSAM)
**Bacidia millegrana* (Taylor) Zahlbr.	"	C		ca. 1575			+														5060B (BSA)
Bacidia nigrofusca (Müll. Arg.) Zahlbr.	"	C		ca. 1400										+							619E (BSA)
Bacidia olivaceorufa Vain.	"	F		200–300				+		+				+				+		+	11810 (ASSAM)
**Bacidia rubella* (Hoffm.) A. Massal.	"	C		750–1500					+												10592 (ASSAM)
Bacidia submedialis (Nyl.) Zahlbr.	"	C		500 –1700									+	+							284B (BSA), 7–013645 (LWG)
Bacidina apiahica (Müll. Arg.) Vezda	"	F		225–900							+										12894P (ASSAM)
Bacidina mastothallina (Vain.) Vezda	"	F		300–800			+				+								+		12977I (ASSAM)

Continued

Table A1. *Continued.*

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subunsiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
Bactrospora myriadea (Fée) Egea & Torrente	Roccellaceae	C		–							+										Dubey et al. 2007
Baculifera remensa (Stirt.) Marbach	Physciaceae	C		300–400								+									5035 (BSA)
Badimia galbinea (Kremp.) Vezda	Pilocarpaceae	F		200–300						+		+						+			13045 (ASSAM)
Bapalmuia palmularis (Müll. Arg.) Sérus.	Pilocarpaceae	F		1300–1400					+		+			+			+	+	+		12948I (ASSAM)
Biatora subduplex (Nyl.) Printzen	Ramalinaceae	C		ca. 510							+										06–006588 (LWG)
**Biatora vernalis* (L.) Fr.	"	C		ca. 1500										+							4782 (ASSAM)
Brigantiaea leucoxanthum (Spreng.) R. Sant. & Hafellner	Brigantiaeaceae	C		ca. 220							+										Dubey et al. 2007
**Buellia aethalea* (Ach.)Th.Fr.	Physciaceae	C		ca. 2450				+													9420, 10501 (ASSAM)
Buellia alboatra (Hoffm.) Th. Fr.	"	C		–										+							Pinokiyo et al. 2008
Buellia leptocline (Flot.) Körb.	"	C		ca. 1500										+							355A (BSA)
**Buellia morehensis* Kr.P. Singh & S.R. Singh	"	C	E	1625–1800			+														1925 (ASSAM)
**Buellia pharcidia* (Ach.) Malme	"	C		3200–3650													+				7802 (ASSAM)
**Buellia posthabita* Nyl. Zahlbr.	"	S		ca. 500					+												10602 (ASSAM)
**Buellia subtigmea* S.R. Singh & D.D.Awasthi	"	C	E	500–1700						+											10501 (ASSAM)
Byssolecania deplanata (Müll. Arg.) R. Sant.	Pilocarpaceae	F		ca. 800	+						+				+			+			12314A (ASSAM)
Byssolecania fumosonigricans (Müll. Arg.) R. Sant.	"	F		500–700										+							11769D (ASSAM)
Byssoloma chlorinum (Vain.) Zahlbr.	Pilocarpaceae	F		500–1300							+		+								11760B (ASSAM)
Byssoloma leucoblepharum (Nyl.) Vain.	"	F		800–2000										+	+			+			12632B (ASSAM)
Byssoloma polychromum (Müll. Arg.) Zahlbr.	"	F		ca. 800							+							+			12504B (ASSAM)
Byssoloma subdiscordans (Nyl.) P. James var. *subdiscordans*	"	F		550–850							+	+						+	+		12941C (ASSAM)
Byssoloma tricholomum (Mont.) Zahlbr.	"	F		200–300							+								+		11802B (ASSAM)
Calenia aspidota (Vain.) Vezda	Graphidaceae	F		550–900				+													12850D (ASSAM)
**Calicium indicum* Tibell	Physciaceae	C	E	3200–3650												+					7802A (ASSAM)
Calicium sp.1	"	C		3200–3650												+					7802B (LWG)
Calopadia fusca (Müll. Arg.) Vezda	Pilocarpaceae	F		200–1600						+	+				+			+			12637B (ASSAM)
Calopadia nymanii (R. Sant.) Vezda	"	F		ca. 550							+										13146D (ASSAM)
Calopadia perpallida (Nyl.) Vezda	"	F		200–500	+						+		+			+		+			11805 (ASSAM)
Calopadia puiggarii (Müll. Arg.) Vezda	"	F		200–300									+	+				+			11910A (ASSAM)
Calopadia subcoerulescens (Zahlbr.) Vezda	"	F		350–800			+	+									+				13218A (ASSAM)
Caloplaca bassiae (Willd. ex Ach.) Mahler.	Teloschistaceae	C		500–1500										+							538 (BSA)
**Caloplaca brebissonii* (Fée) J. Sant. ex Hafellner & Poelt	"	C		ca. 1200			+														11338 (ASSAM)
Caloplaca ferruginea (Huds.)Th.Fr.	"	C		ca. 2641m			+														5012 (BSA)
**Caloplaca flavorubescens* (Huds.) J.R. Laundon	"	C		ca. 2641m			+														5147 (BSA)
**Caloplaca handelii* (Zahlbr.) D.D. Awasthi	"	S		2000–2500			+														11365 (ASSAM)
**Caloplaca herbidella* (Nyl. ex Hue) H. Magn.	"	C		ca. 1184			+														5142C (BSA)
Caloplaca indica Y.Joshi, Jagadeesh & Sinha	"	C	E	ca. 2000			+														4979 (BSA)
**Caloplaca saxicola* (Hoffm.) A. Nordin	"	S		ca. 1800			+														11423 (ASSAM)
Carbacanthographis marcescens (Fée) Staiger & Kalb	Graphidaceae	C		ca. 300						+	+										07–009098 (LWG), 3043B (ASSAM)
Catillaria sp. 1	Catillariaceae	C		ca. 340	+									+							9616 (ASSAM)
**Chapsa pseudophlyctis* (Nyl.) A. Frisch	Graphidaceae	C		ca. 750					+												10367, 10601 (ASSAM)
Chapsa sp. 1	"	C		ca. 1500										+							11206 (ASSAM)
Chiodecton leptosporum Müll. Arg.	Roccellaceae	C		ca. 500							+										06–006570 (LWG)

Continued

Table A1. *Continued.*

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subunsiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
Chroodiscus coccineus (Leight.) Müll. Arg	Graphidaceae	F		ca. 250																+	13055C (ASSAM)
Chroodiscus mirificus (Kremp.) R. Sant.	"	F		200–800						+								+			12697D (ASSAM)
**Chrysothrix candelaris* (L.) J.R. Laundon	Chrysotrichaceae	C		200–1645			+														9028, 9030 (ASSAM)
Coccocarpia palmicola (Spreng.) Arv. & D.J.Galloway	Coccocarpiaceae	F		ca. 325							+										2884L (ASSAM)
Coccotrema cucurbitula (Mont.) Müll. Arg.	Coccotremataceae	C		ca. 2125			+														5138 (BSA)
Coenogonium luteum (Dicks.) Kalb & Lücking	Coenogoniaceae	CF		ca. 1500										+							452B (BSA)
Coenogonium subluteum (Rehm) Kalb & Lücking	"	CF		300–1340										+							452B (BSA)
*Coenogonium zonatum (*Müll. Arg.) Kalb & Lücking	"	F		ca. 1100										+							152C (BSA)
**Cresponea plurilocularis* Egea & Torrente	Roccellaceae	C		400–950								+									2737 (ASSAM)
Cryptothecia candida (Kremp.) R. Sant.	Arthoniaceae	C		ca. 500										+							502 (BSA)
Cryptothecia effusa (Müll. Arg.) R. Sant.		C		ca. 200				+													10139 (ASSAM)
**Cryptothecia faveolata* Makhija & Patw.	"	C		ca. 750					+												10459 (ASSAM)
Cryptothecia lunulata (Zahlbr.) Makhija & Patw.	"	C		ca. 900							+										2719 (ASSAM)
**Cryptothecia punctulata* Makhija & Patw.	"	C		300–400				+													10042 (ASSAM)
**Cryptothecia scripta* G. Thor	"	C		ca. 200				+								+					10085, 10074 (ASSAM)
Cryptothecia sp.1	"	C		ca. 500								+									2935 (ASSAM)
Cyphelium inquinans (Sm.) Trev.	Physciaceae	C		3200–3650													+				7802 (ASSAM)
Diorygma heiroglyphium (Pers.) Staiger & Kalb	Graphidaceae	C		300–1216		+				+								+		+	4854 (BSA)
Diorygma junghuhnii (Mont. & Bosch.) Kalb, Staiger & Elix	"	C		350–500		+		+		+				+						+	4733 (BSA)
Diorygma longilirellatum B.O. Sharma & Makhija	"	C	E	ca. 1216		+															4825, 4845 (BSA)
Diorygma macgregorii (Vain.) Staiger & Elix	"	C		ca. 1216		+															4833, 4826 (ASSAM)
Diorygma megasporum Kalb, Staiger & Elix	"	C		202–1700		+								+							4860 (BSA)
Diorygma pachygraphum (Nyl.) Kalb, Staiger & Elix.	"	C		850–1216		+					+										4831 (BSA)
Diorygma pruinosum (Eschw.) Kalb, Staiger & Elix	"	C		ca. 300						+											3094A (ASSAM)
Diorygma radiatum (D.D.Awasthi & S.R. Singh) Kr.P.Singh & Swanalatha	"	S	E	ca. 500										+							11087 (ASSAM)
**Diorygma soozanum* (Zahlbr.) M. Nakan. & Kashiw.	"	C		ca. 202		+															5219 (BSA)
**Diploschistes caesioplumbeus* (Nyl.) Vain.	Graphidaceae	S		ca. 900		+															9255(ASSAM)
**Diploschistes cinereorcaesius* (Sw. ex Ach.)Vain.	"	T		1050–1750										+							8120 (ASSAM)
**Diploschistes diacapsis* (Ach.) Lumbsch	"	T		750–1500					+												10607 (ASSAM)
**Diploschistes scruposus* (Schreb.) Norman	"	S		ca. 1000					+												10444 (ASSAM)
Dyplolabia afzelii (Ach.) A.Massal.	"	C		ca. 150																+	4174 (BSA)
Echinoplaca epiphylla Fée	"	F		750–1100						+			+								12985A (ASSAM)
Echinoplaca pellicula (Müll. Arg.) R. Sant.	"	F		800–2000														+			12419 (ASSAM)
Erythrodecton malacum (Kremp.) G. Thor	Roccellaceae	C		550–1200				+				+									5904 (ASSAM)
Fellhanera bouteillei (Desm.) Vezda	Pilocarpaceae	F		200–1500					+		+			+	+			+			11826C (ASSAM)
Fellhanera fuscatula (Müll. Arg.) Vezda	"	F		500–1300										+				+			11170B (ASSAM)
Fellhanera rhapidopfylli (Rehm) Vezda	"	F		230–500					+		+				+			+			11805C (ASSAM)
Fellhanera semecarpi (Vain.) Vezda	"	F		1300–1500					+		+				+				+		12932H (ASSAM)
Fissurina subcontexta Ach.	Graphidaceae	C		ca. 400										+							L81796 (LWG)
Fissurina sp. 1	"	C		ca. 136		+															4662 (BSA)
Glyphis cicatricosa Ach.	"	C		202–1100		+			+		+										4961 (BSA)
Glyphis scyphulifera (Ach.) Staiger	"	C		220–229		+										+					4279 (BSA)

Continued

Table A1. *Continued.*

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subunsiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
Graphidastra byssiseda (Müll. Arg.) G. Thor	Roccellaceae	C		1033–1170																08-009421 (LWG)
Graphis ajarekarii Pat. & C.R.Kulk	Graphidaceae	C	E	ca. 202			+													5257 (BSA)
Graphis anfractuosa (Eschw.) Eschw.	"	C		ca. 500m							+									Dubey et al. 2007
Graphis caesiella Vain	"	C		1000–1575			+	+	+											5068 (BSA)
Graphis capillacea Stirt.	"	C		300–400				+												10035 (ASSAM)
Graphis chlorotica A. Massal.	"	C		1350–1650										+						469B (BSA)
Graphis cincta (Pers.) Aptroot	"	C		ca. 1095			+			+								+		823 (ASSAM)
Graphis contortuplicata Müll. Arg.	"	C		ca. 300						+										40159 (ASSAM)
Graphis crebra Vain.	"	C		–						+										10696D (ASSAM)
Graphis cycasicola A.W. Archer & Elix	"	C		1950–2050			+													5683 (ASSAM)
Graphis daintriensis (A.W. Archer) A.W. Archer	"	C		ca. 300			+													4640 (BSA)
Graphis dimidiata Vain.	"	C		1700–1900			+													2011 (ASSAM)
Graphis duplicata Ach.	"	C		680–1601			+				+								+	2537 (ASSAM)
Graphis farinulenta Müll. Arg.	"	C		ca. 500										+						282C (BSA)
Graphis filiformis Adaw. & Makhija	"	C		ca. 1216			+													4872,4866 (BSA)
Graphis furcata Fée	"	C		400–1184			+													1116A (ASSAM)
**Graphis galactoderma* (Zahlbr.) Lücking	"	C		ca. 200																10173 (BSA)
Graphis glaucescens Fée	"	C		136–200			+													10164 (BSA)
Graphis handelii Zahlbr.	"	C		ca. 2250						+				+						10696D (ASSAM)
Graphis intermediella Stirt.	"	C		200–300															+	659 (ASSAM)
Graphis japonica (Müll. Arg.) A.W. Archer & Lücking	"	C		300–600				+		+				+						2136 (ASSAM)
Graphis kousyuensis (Horik. & M. Nakan.) Lücking	"	C		220–229			+													5313, 5294 (BSA)
Graphis leptoclade Müll. Arg.	"	C		ca. 500										+						11038 (ASSAM)
Graphis librata C. Knight	"	C		500–1184			+							+						516 (BSA)
Graphis longiramea Müll. Arg.	"	C		250–900										+		+			+	967 (ASSAM)
Graphis longispora D.D.Awasthi & S.R. Singh	"	C	E	ca. 900										+						4786 (ASSAM)
Graphis marginata Raddi	"	C		ca. 400							+									2611 (ASSAM)
Graphis nanodes Vain.	"	C		250–300			+													55, 5305 (BSA)
Graphis nuda (Magn.) Staiger & Lücking	"	C		390–400										+						448 (BSA)
Graphis oligospora Zahlbr.	"	C		ca. 500										+						10871 (ASSAM)
Graphis paraserpens Lizano & Lücking	"	C		1100–1500			+													64 (BSA)
Graphis parilis Kremp.	"	C		300–440			+	+												10084 (ASSAM)
Graphis pavoniana Fée	"	C		ca. 202																5256 (ASSAM)
Graphis pertricosa (Kremp.) A.W. Archer	"	C		1184–1800			+													1897 (ASSAM)
Graphis pinicola Zahlbr.	"	C		ca. 202			+													5244 (BSA)
Graphis proserpens Vain.	"	C		2500–2750			+	+						+						376A (BSA)
Graphis pyrrhocheiloides Zahlbr.	"	C		ca. 600												+				4277A (ASSAM)
Graphis renschiana (Müll. Arg.) Stizenb.	"	C		ca. 160			+													4741 (BSA)
Graphis scripta (L.) Ach.	"	C		300–400			+	+		+										10690 (ASSAM)
Graphis sitapurensis Makhija & Adaw.	"	C	E	ca. 1550										+						551A/2 (BSA)
Graphis streblocarpa (Bel.) Nyl.	"	C		750–900			+		+	+					+			+		4835 (ASSAM)
Graphis striatula (Ach.) Spreng.	"	C		550–1050			+	+												4787 (BSA)

Continued

Table A1. *Continued.*

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subunsiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
Graphis subassimilis Müll. Arg.	Graphidaceae	C		300–500						+										3002 (ASSAM)
Graphis subserpentina Nyl.	"	C		1625–1800			+													1900A (ASSAM)
Graphis tenella Ach.	"	C		1550–1700										+						608 (BSA)
Graphis valparaiensis Adaw. & Makhija	"	C	E	400–1500										+		+		+		5180 (ASSAM)
Graphis vittata Müll. Arg.	"	C		ca. 400			+					+						+		331 (ASSAM)
Gyalectidium filicinum Müll. Arg.	"	F		200–300						+	+		+	+	+			+		11830C (ASSAM)
**Haematomma puniceum* (Sw.) A. Massal.	Haematommataceae	C		ca. 1600			+		+											5286 (BSA)
Haematomma wattii (Stirt.) Zahlbr.	"	C		ca. 2350										+						298A (BSA)
Haemmatoma sp.1	"	C		2500–2700										+						394B (BSA)
Hafellia curatellae (Malme) Marbach	Physciaceae	C		300–1600					+									+		9752 (ASSAM)
Hemithecium amboliense Makhija & A. Dube	Graphidaceae	C	E	ca. 500										+						504F (ASSAM)
Hemithecium aphaneomicrosporum Makhija & A.Dube	"	C	E	ca. 160			+													4757 (BSA)
Hemithecium aphanes (Mont. & Bosch.) M.Nakan. & Kashiw.	"	C		300–440			+	+						+						4901 (ASSAM)
Hemithecium isidiatum Upreti & U. Dubey	"	C	E	ca. 200							+									06-006534 (LWG)
Hemithecium nagalandicum (Kr.P. Singh & G.P. Sinha) Adaw. & Makhija	"	C	E	1400–1250			+							+						11225 (ASSAM)
Hemithecium nakanishianum (Patw. & C.R. Kulk.) Makhija & A.Dube	"	C		ca. 136			+													4652 (BSA)
Hemithecium noristicticum Makhija & A.Dube	"	C	E	250–300			+													11292 (ASSAM)
**Herpothallon cinereum* G. Thor	Arthoniaceae	C		ca. 1300										+						7139 (ASSAM)
**Herpothallon echinatum* Aptroot	"	C		ca. 750					+											10472 (ASSAM)
**Herpothallon isidiatum* Jagadeesh Ram & G.P.Sinha	"			160–229																4234 (BSA)
Herpothallon japonicum (Zahlbr.) G. Thor	"	C		300–440				+												10091 (ASSAM)
Herpothallon philippinum (Vain.) Aptroot & Lücking	"	C		136–400														+		346 (ASSAM)
Herpothallon sticticum Jagadeesh Ram & G.P.Sinha	"		E	ca. 1200			+													11331 (ASSAM)
Ionaspis lacustris (With.) Lutzoni	Hymeneliaceae	C		ca. 2400										+						428C (BSA)
Lasioloma arachnoideum (Kremp.) R. Sant.	Pilocarpaceae	F		300–400													+	+		12431B (ASSAM)
Lasioloma phycophilum (Vain.) R. Sant.	"	F		ca. 325							+									12884C (ASSAM)
**Laurera megasperma* (Mont.) Riddle	Trypetheliaceae	C		ca. 1200										+						583E (BSA)
Laurera meristospora (Mont. & Bosch.) Zahlbr.	"	C		ca. 1550				+		+				+						343E (BSA)
Lecanora achroa Nyl.	Lecanoraceae	C		1200–1500			+													9872 (ASSAM)
Lecanora alba Lumbsch	"	C		ca. 2050											+					305A,385C (BSA)
Lecanora aff. *albella* (Pers.) Ach.	"	C		ca.1575			+								+					7836 (ASSAM)
Lecanora austointumescens Lumbsch & Elix	"	C		ca. 1250				+						+						9908 (ASSAM)
Lecanora concilianda Vain.	"	C		1250–1500			+											+		9882,9875 (ASSAM)
Lecanora fimbriatula Stirt.	"	C		600–900										+	+			+		4773,4485 (ASSAM)
Lecanora helva Stizenb.	"	C		ca. 1600			+		+											10567, 10605 (ASSAM)
Lecanora hensenniae Vanska	"	S		1500–2300			+													4921 (BSA)
Lecanora impudens Degel.	"	C		ca. 1100											+					4411,4389 (ASSAM)
Lecanora imshaugii Brodo	"	C		600–800														+		715 (ASSAM)
Lecanora interjecta Müll. Arg	"	C		–										+						Pinokiyo *et al.* 2008
Lecanora perplexa Brodo	"	C		ca. 200							+				+					4212, 4095 (ASSAM)
Lecanora phaeocardia Vain.	"	C		2500–2750										+						388A (BSA)
Lecanora rugosella Zahlbr.	"	C		ca. 2125			+													4969 (BSA)

Continued

Table A1. *Continued.*

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subunsiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
Lecanora streimanii Lumbsch	Lecanoraceae	C		ca. 500										+							522A (BSA)
Lecanora subalbellina Vain.	"	C		ca. 1600				+													449 (ASSAM)
Lecanora subimmersa (Fée) Vain.	"	C		600–800						+											10524 (ASSAM)
Lecanora subjaponica L. Lü & H. Y. Wang	"	C		ca. 2250										+							439B (BSA)
Lecanora tropica Zahlbr.	"	C		ca. 2100				+		+											10112, 5069 (ASSAM)
Lecanora wilsonii Mull Arg.	"	S		1500–1550																	359A (BSA)
Lecanora sp. 1	"	C		2306–2344			+														4971 (BSA)
Lecidea lapicida (Ach.) Ach.	Lecideaceae	S		600–800						+											10515, 10497 (ASSAM)
Lecidea sp.1	"	C		500–950								+									2735 (ASSAM)
Leiorreuma exaltatum (Mont. & Bosch) Staiger	Graphidaceae	C		400–900												+			+		4886 (ASSAM)
Leiorreuma lyellii (Sm.) Staiger	"	C		ca. 500											+						10870 (ASSAM)
Leiorreuma subpatellulum Dubey, Upreti & Nayaka	"	C	E	900									+								07–011897 (LWG)
Lepraria aff. *casieoalba* (B. de Lesd.) J.R. Laundon	Stereocaulaceae	C		ca. 1100					+												10684 (ASSAM)
**Lepraria lobificans* Nyl.	"	C		ca. 200			+			+											9023, 10623 (ASSAM)
Letrouitia transgressa (Malme) Hafellner & Bellem	Letrouitiaceae	C		150–900											+	+					4534, 5044 (ASSAM)
Lithothelium decumbens (Müll. Arg.) Aptroot	Pyrenulaceae	C		–							+										Dubey et al. 2007
**Lithothelium hyalosporum* (Nyl.) Aptroot	"	C		ca. 136			+														4692 (BSA)
Lithothelium obtectum (Müll. Arg.) Aptroot	"	C		ca. 500										+							81723 (LWG)
Loflammia gabrielis (Mull. Arg.)Vezda	Pilocarpaceae	F		ca. 800													+				12507 (ASSAM)
Loflammia intermedia (R. Sant.) Vezda	"	F		230–500						+											11938 (ASSAM)
Malmidea granifera (Ach.) Kalb, Rivas Plata & Lumbsch	Malmideaceae	C		500–700								+									2834, 504 B (BSA)
Maronea manipurensis H. Magn.	Fuscideaceae	C	E	ca. 2350										+							298B (BSA)
Mazosia bambusae (Vain.) R. Sant.	Roccellaceae	F		500–800						+	+						+				11772D (ASSAM)
Mazosia melanophthalma (Müll. Arg.) R. Sant.	"	F		200–800						+	+			+			+				11843B (ASSAM)
Mazosia phyllosema (Nyl.) Zahlbr.	"	F		200–800						+	+	+	+	+	+		+				11838A (ASSAM)
Mazosia rotula (Mont.) A. Massal.	"	F		200–650						+	+						+	+			11796B (ASSAM)
Mazosia tumidula (Stirt.) Müll. Arg.	"	F		200–850							+		+				+				11802F (ASSAM)
Megalaria laureri (Hepp. ex Th. Fr.) Hafellner	Megalariaceae	C		ca. 1500					+					+							10310 (ASSAM)
Megalospora tuberosculosa (Fée) Sipman	Megalosporaceae	C		375–1600					+		+			+						+	8691 (ASSAM)
Megalospora atrorubricans (Nyl.) Zahlbr.	"	C		ca. 1600			+														11416 (ASSAM)
Mycobilimbia hunana (Zahlbr) D.D.Awasthi	Lecideaceae	T		ca. 1800			+														11436 (ASSAM)
Mycobilimbia philippina (Vain.) D.D. Awasthi	"	S		ca. 2350											+						294A (BSA)
Mycoblastus affinis (Schaer.) Schauer.	Mycoblastaceae	C		3200–3600													+				7830A (ASSAM)
**Mycomicrothelia conothelena* (Nyl.) D. Hawksw.	Arthopyreniaceae	C	E	ca. 2344			+														4987 (BSA)
**Myriotrema microporum* (Mont.) Hale	Graphidaceae	C		1500–1700										+							586A (BSA)
**Myriotrema rugiferum* (Harm.) Hale	"	C		ca. 1550						+											10738 (ASSAM)
**Ocellularia allosporoides* (Nyl.) Patw. & C.R. Kulk.	Graphidaceae	C		ca. 300										+							493 (BSA)
Ocellularia neopertusariiformis Hale	"	C		200–300			+														10607 (ASSAM)
Ocellularia subgranulosa (Homchantara & Coppins) Lumbsch & Papong	"	C		ca. 340	+																9617 (ASSAM)
**Ochrolechia harmandii* Verseghy	Ochrolechiaceae	C		–											+						4736 (ASSAM)
**Ochrolechia subpallescens* Verseghy	"	C		2360–2344			+														4960 (ASSAM)
Opegrapha filicina Mont.	Roccellaceae	F		350–600															+		12802A (ASSAM)

Continued

Table A1. *Continued.*

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subansiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
**Opegrapha vulgata* (Ach.) Ach.	Roccellaceae	C		ca. 500					+												10635 (ASSAM)
Ophioparma ventosa (L.) Norman	Ophioparmaceae	C		3000–3470		+	+														9507 (ASSAM)
**Pallidogramme bengalense* B.O.Sharma & P. Khadilkar	Graphidaceae	C	E	1250–1500			+														9904 AASSAM
Pallidogramme chrysenteron (Mont.) Staiger, Kalb & Lücking	"	C		ca. 900					+												620 (ASSAM)
Pallidogramme sp. 1	"	C		1250–1500			+														9904B (ASSAM)
**Pertusaria alpina* Hepp.	Pertusariaceae	C		ca. 1601			+														5042 (BSA)
**Pertusaria ceylonica* Müll. Arg.	"	C		ca. 800															+		925 (BSA)
Pertusaria coccodes (Ach.) Nyl.	"	C		1100–1300										+							465A (BSA)
**Pertusaria colorata* Awasthi & Srivastava	"	C	E	ca. 1360			+														4756 (BSA)
Pertusaria composita Zahlbr.	"	C		ca. 2123			+														5139 (BSA)
Pertusaria indica Preeti Srivast. & D.D. Awasthi	"	S	E	ca. 400										+							515 A(BSA)
Pertusaria leucosorodes Nyl.	"	C		ca. 2123			+														5139B (BSA)
Pertusaria multipuncta (Turn.) Nyl.	"	C		1800–3200			+					+									7837 (BSA)
**Pertusaria pertusa* (L.) Tuck.	"	C		ca. 1200			+														11234 (ASSAM)
Pertusaria quassiae (Fée) Nyl.	"	C		ca. 750					+					+							10352 (ASSAM)
Pertusaria submultipuncta Nyl.	"	C		200–300							+										Dubey et al. 2007
Pertusaria sp.1	"	C		2600–2750		+															1627 (ASSAM)
Phaeographis caesioradians (Leight.) A.W. Archer	Graphidaceae	C		300–600						+											4053 (ASSAM)
Phaeographis dendroides (Leight.) Müll. Arg.	"	C		ca. 500							+										06–006342 (LWG)
Phaeographis divaricoides Räsänen	"	C	E	1500–1550										+							616B (BSA)
Phaeographis intricans (Nyl.) Staiger	"	C		1500–1700										+							581D (BSA)
Phaeographis scalpturata (Ach.) Staiger	"	C		300–800														+			308 (ASSAM)
Phaeographopsis indica Patw. & Nagarkar) Sipman & Aptroot	"	C		ca. 202		+															5182 (BSA)
**Phylctis karnatakana* S. Joshi & Upreti	Phlyctidaceae	C	E	750–1500				+													10581 (ASSAM)
Phylctis subhimalayensis S. Joshi & Upreti	"	C	E	–		+															009294 (LWG)
Phyllobathelium indicum G.P. Sinha & Kr. P. Singh	Phyllobatheliaceae	F	E	200–300							+							+			11811 D (ASSAM)
Platygramme caesiopruinosa (Fée) Fée	Graphidaceae	C		1625–1800		+															1900B (ASSAM)
Platygramme discurrens (Nyl.) Staiger	"	C		ca. 900							+										2481C (ASSAM)
**Platygramme muelleri* (A.W. Archer) Staiger	"	C		ca. 300							+			+							145 (ASSAM)
**Platygramme pudica* (Mont. & Bosch) M. Nakan. & Kashiw	"	C		300–800															+		753 (ASSAM)
Pliariona montagnei (Bosch) A. Massal.	"	C		–							+										Dubey et al. 2007
Porina albicera (Kremp.) Overeem	Porinaceae	F		200–800														+			11820A (ASSAM)
Porina andamanica Makhija & al.	"	C	E	1100–1200										+	+						552B (BSA)
Porina applanata Vain.	"	F		ca. 500	+	+	+						+	+							13293B (ASSAM)
Porina articeps (Vain.) Vain.	"	F		200–1300					+					+	+			+			11707B (ASSAM)
Porina atrocoerulea Müll. Arg.	"	F		950–1150											+						12968F (ASSAM)
Porina atroperiostiola Makhija, Adaw. & Patw.	"	C	E	400–500										+							504E (BSA)
Porina belanospora (Nyl.) Müll. Arg.	"	C		300–400										+							460, 464 (BSA)
Porina conica R. Sant.	"	F		200–1300					+	+				+	+			+			11558A (ASSAM)
Porina cupreola (Müll. Arg.) F. Schill.	"	F		200–800										+	+			+			11823 (ASSAM)
Porina epiphylla (Fée) Fée	"	F		200–1550					+	+				+	+			+			11801C (ASSAM)
Porina fulvella Müll. Arg.	"	F		500–800											+			+			11799A (ASSAM)

Continued

Table A1. *Continued.*

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subunsiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
**Porina glaucoflava* Makhija & al.	Porinaceae	C	E	300–400				+												9838 (ASSAM)
**Porina halei* Makhija & al.	"	C	E	1100–1200			+													31 (BSA)
Porina imitatrix Müll. Arg.	"	F		200–1150										+	+			+		11856A (ASSAM)
Porina innata (Nyl.) Müll. Arg.	"	C		ca. 650										+						4205 (ASSAM)
Porina internigrans (Nyl.) Müll.	"	C		ca. 500																9936 (ASSAM)
Porina kameruensis F. Schill.	"	F		200–300														+	+	11816A (ASSAM)
Porina karnatakensis Makhija & al.	"	F		200–800														+	+	11816B (ASSAM)
Porina limbulata (Kremp.) Vain.	"	F		200–800							+		+		+			+	+	11557A (ASSAM)
Porina lucida R. Sant.	"	F		200–800							+	+		+	+			+	+	11811C (ASSAM)
Porina mastoidella (Nyl.) Müll. Arg.	"	C		ca. 600						+										10788 (ASSAM)
Porina monocarpa (Kremp.) F. Schill.	"	F		200–1100						+	+		+	+	+			+	+	11795B (ASSAM)
Porina napensis Lücking	"	F		1200				+			+	+								13276G (ASSAM)
Porina nitidula Müll. Arg.	"	F		200–800						+			+	+				+	+	11799B (ASSAM)
Porina rufula (Kremp.) Vain.	"	F		200–1550							+		+	+	+			+	+	11812B (ASSAM)
Porina subhibernica Upreti	"	C		600–800						+										4210 (ASSAM)
Porina subinterstes (Nyl.) Müll. Arg.	"	C		ca. 1500										+						630A (ASSAM)
Porina tetracerae (Afz.) Müll. Arg.	"	C	F	650–1500										+	+					615A (BSA), 4209 (ASSAM)
Porina tijucana Vain.	"	S		ca. 900										+						4783 (ASSAM)
Porina trichothelioides R. Sant.	"	F		200–800														+	+	11802B (ASSAM)
Porina sp. 1	"	S		ca. 500					+											5547 (ASSAM)
Porina sp. 2	"	C		ca. 930						+										3040 (ASSAM)
Porina virescens (Kremp.) Müll. Arg.	"	F		200–800						+	+			+				+	+	11829B (ASSAM)
**Porpidia albocoerulescens* (Wulfen) Hertel & Knoph	Lecideaceae	S		950–1150						+										10521, 8031 (ASSAM)
**Porpidia macrocarpa* (DC.) Hertel & Knoph	"	S		ca. 1100											+					4453 (ASSAM)
Pseudopyrenula diluta (Fée) Müll. Arg.	Trypetheliaceae	C		ca. 400										+						505B (BSA)
**Pseudopyrenula subnudata* Müll. Arg.	"	C		ca. 136			+													4691 (BSA)
Pyrenula aggregata (Fée) Fée	Pyrenulaceae	C		1500–1700						+				+						10795 (ASSAM)
Pyrenula anomla (Ach.) Vain.	"	C		400–500			+							+						1117 (ASSAM)
Pyrenula aspistea (Ach.) Ach.	"	C		ca. 136																4689 (BSA)
Pyrenula balia (Kremp.) R.C. Harris	"	C		ca. 136			+			+										10729 (ASSAM)
Pyrenula breutelii (Müll. Arg.) Aptroot	"	C		–											+					Upreti 1998 (LWG)
Pyrenula brunnea Fée	"	C		ca. 400			+			+										1146 (ASSAM)
Pyrenula castanea (Eschw.) Müll. Arg.	"	C		300–400				+												10080 (ASSAM)
Pyrenula complanata (Mont.) Trevis.	"	C		100–1500						+										4014,4039 (ASSAM)
Pyrenula duplicans (Nyl.) Aptroot.	"	C		ca. 1000						+										10820 (ASSAM)
Pyrenula fetivica (Kremp.) Müll. Arg.	"	C		ca. 400			+													1145 (ASSAM)
Pyrenula globifera (Eschw.) Aptroot	"	C		ca. 400						+										10490 (ASSAM)
Pyrenula immissa (Stirt.) Zahlbr.	"	C		ca. 400																10384 (ASSAM)
Pyrenula interducta (Nyl.) Zahlbr.	"	C		ca. 1216						+		+								10541 (ASSAM)
Pyrenula leucotrypa (Nyl.) Upreti	"			–							+									Dubey et al. 2007
Pyrenula maravalensis Vain.	"	C		ca. 500										+						102A (BSA)
Pyrenula minarum Vain.	"	C		100–1400										+						11219 (ASSAM)

Continued

Table A1. *Continued.*

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subunsiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
Pyrenula oculata Ajay Singh & Upreti	Pyrenulaceae	C	E	ca. 1000						+											3054 (ASSAM)
Pyrenula papillifera (Nyl.) Aptroot	"	C		1500–1550										+							615C (BSA)
Pyrenula platystoma (Müll. Arg.) Aptroot	"	C		ca. 1600					+												9762 (ASSAM)
Pyrenula punctella (Nyl.) Trevis.	"	C		600–800						+											10490 (ASSAM)
Pyrenula quassiaecola Fée	"	C		1550–1700				+						+							87C (BSA)
Pyrenula subelliptica (Tuck.) R.C. Harris	"	C		ca. 1575			+														5060 (BSA)
Pyrenula sublaevigata (Patw. & Makhija) Upreti	"	C		ca. 1000						+											10744 (ASSAM)
Pyrenula thailandica Aptroot	"	C		ca. 300											+						81724 (LWG)
Pyrenula zeylanica Upreti & Ajay Singh	"	C	E	–						+				+							20150A (LWG)
Pyrenula sp. 1	"	C		1500–1700										+							587C (BSA)
Pyrgillus cubanus Nyl.	Pyrenulaceae	C		1500–1850			+														9316 (ASSAM)
Pyrgillus javanicus (Mont. & Bosch.) Nyl.	"	C		600–800						+											10495, 10507 (ASSAM)
Pyrgillus tibellii Kr.P. Singh & Pushpi Singh	"	C	E	ca. 340	+														+		9616 (ASSAM)
**Ramboldia russula* (Ach.) Lumbsch & Elix	Lecanoraceae	C		ca. 1645			+														5038 (BSA)
**Rhabdodiscus asiaticus* (Vain.) Rivas Plata, Lücking & Lumbsch	Graphidaceae	C		600–800						+											10549 (ASSAM)
**Rhabdodiscus auberianus* (Nyl.) Vain.	"	C		ca. 500															+		323 (ASSAM)
Rhabdodiscus crassus (Müll. Arg.) Rivas Plata, Lücking & Lumbsch	"	C		ca. 1550										+							547F (BSA)
Rhabdodiscus indicus Pushpi Singh & Kr. P. Singh	"	C	E	600–800						+											10512 (ASSAM)
**Rhizocarpon geographicum* (L.) DC.	Rhizocarpaceae	S		3200–3650												+					7829, 7747 (ASSAM)
Rhizocarpon sp. 1	"	S		3000–3470	+																9524 (ASSAM)
Rinodina intrusa (Kremp.) Malme	Physciaceae	C		ca. 500									+								591E (ASSAM)
Rinodina mackenziei Räsänen	"	S		1704–1900			+														334 (BSA)
Rinodina sophodes (Ach.) A. Massal.	"	C		–										+							Pinokiyo et al. 2008
Rinodina sp. 1	"	S		1800–2400			+														11441 (ASSAM)
Sarcographa heteroclita (Mont.) Zahlbr.	Graphidaceae	C		–							+										Dubey et al. 2007
Sarcographa glyphiza (Nyl.) Kr.P. Singh & G.P. Sinha	"	C	E	300–600				+		+	+										10090 (ASSAM)
Sarcographa labyrinthica (Ach.) Müll. Arg.	"	C		250–600						+						+		+	+		761, 977 (ASSAM)
Sarcographa medusulina (Nyl.) Müll. Arg.		C		–							+										Dubey et al. 2007
Sarcographa subtorquescens (Nyl.) Zahlbr.	"	C		–							+										Dubey et al. 2007
Sarcographa tricosa (Ach.) Müll. Arg.	"	C		400–900					+					+		+			+		969, 11117 (ASSAM)
Schistophoron indicum Kr.P.Singh & Swarnalatha	"	C	E	500–700								+									2858 (BSA)
Sporopodium argillaceum (Müll. Arg.) Zahlbr.	Pilocarpaceae	F		200–300						+				+				+			11833 (ASSAM)
Sporopodium awasthianum Kr.P.Singh & Pinokiyo	"	F	E	300–400			+				+									+	12818C (ASSAM)
Sporopodium phyllocharis (Mont.) A. Massal.	"	F		230–850						+	+										12931 (ASSAM)
Sporopodium xantholeucum (Müll. Arg.) Zahlbr.	"	F		200–1300			+			+	+			+				+			11798A (ASSAM)
Staurothela clopima (Wahlenb.) Th. Fr.	Verrucariaceae	S		ca. 1000						+				+							10757 (ASSAM)
Strigula antillarum (Fée) Müll. Arg.	Strigulaceae	F		325–850							+										12883P (ASSAM)
Strigula concreta (Fée) R. Sant.	"	F		200–500						+				+				+	+		11760A (ASSAM)
Strigula janeirensis (Müll. Arg.) Lücking	"	F		ca. 500						+											12930A (ASSAM)
Strigula maculata (Cook & Masse) R. Sant.	"	F		750–1150							+		+		+			+			12630B (ASSAM)
Strigula melanobapha (Kremp.) R. Sant.	"	F		ca. 325							+										12883C (ASSAM)
Strigula multipunctata (G. Merr. ex R. Sant.) R.C. Harris	"	F		ca. 800														+			12336C (ASSAM)

Continued

Table A1. *Continued.*

Species	Family	Habitat	Endemic status	Altitudinal range (m)	Distribution in districts															Voucher Number
					Papampure	Tawang	West Kameng	East Kameng	Lower Subunsiri	Upper Subansiri	West Siang	East Siang	Upper Siang	Lower Dibang Valley	Dibang Valley	Lohit	Anjaw	Changlang	Tirap	Namsai	
Strigula nemathora Mont. f. *hypothelia* (Nyl.) Lücking	Strigulaceae	F		500–1300					+	+	+			+					+		11780E (ASSAM)
Strigula nemathora Mont. f. *nemathora* Mont.	"	F		ca. 800														+			77A (ASSAM)
Strigula nitidula Mont.	"	F		200–300							+			+				+	+		11810G (ASSAM)
Strigula orbicularis Fr.	"	F		200–800						+			+					+			12984F (ASSAM)
Strigula phyllogena (Müll. Arg.) R.C. Harris	"	F		200–800				+					+		+			+			11970A (ASSAM)
Strigula smaragdula Fr.	"	F		500–1300					+	+	+		+	+	+			+			12307 (ASSAM)
Strigula subelegans Vain.	"	F		235–800						+	+			+	+			+			12322 (ASSAM)
Strigula subtilissima (Fée) Müll. Arg.	"	F		200–800						+	+		+	+				+			12635D (ASSAM)
Tapellaria bilimbioides R. Sant.	Pilocarpaceae	F		500–1300							+			+	+						11770A (ASSAM)
Tapellaria epiphylla (Müll. Arg.) R. Sant.	"	F		500–1300					+	+				+							11786 (ASSAM)
Tapellaria molleri (Henriq.) R. Sant.	"	F		500–1300						+				+	+						11747B (ASSAM)
Tapellaria nana (Fée) R. Sant.	"	F		ca. 325							+										12883 (ASSAM)
Tapellaria nigrata (Müll. Arg.) R. Sant.	"	F		950–1150							+				+						12961F (ASSAM)
**Thecaria austroindica* (D.D. Awasthi & Upreti) Kr.P. Singh & G.P. Sinha	Graphidaceae	C	E	ca. 400										+							520 (ASSAM)
Thecaria quassiicola Fée	"	C		400–500			+			+	+			+					+		1141 (ASSAM)
Tricharia santessonii D. Hawksw.	"	F		ca. 800							+				+			+			12623F (ASSAM)
Tricharia vainioi R. Sant.	"	F		700– 1500											+						13085C (ASSAM)
Trichothelium epiphyllum Müll. Arg.	Porinaceae	F		200–1550						+	+			+				+			11886B (ASSAM)
Trypethelium albopruinosum Makhija & Patw.	Trypetheliaceae	C	E	–							+										Dubey et al. 2007
Trypethelium dichroum Makhija & Patw.	"	C	E	ca. 800															+		965 (ASSAM)
Trypethelium eluteriae Spreng.	"	C		300–440				+			+										10092 (ASSAM)
Trypethelium inamoenum Müll. Arg.	"	C	E	400–900										+							4930 (ASSAM)
Trypethelium tropicum (Ach.) Müll. Arg.	"	C		300–440												+					4276 (ASSAM)
**Tylophoron moderatum* Nyl.	Arthoniaceae	C		ca. 1300						+								+			7139, 10797 (ASSAM)
**Tylophoron nidulans* Strit.	"	C	E	400–500							+					+					2871 (ASSAM)
Verrucaria aethiobola Wahlb.	Verrucariaceae	S		–							+										Dubey et al. 2007
Verrucaria coerulea (Ramond) DC.	"	S		ca. 1000										+							4861 (ASSAM)
Verrucaria transiliens Arnold	"	S		2306–2344		+								+							7829 (ASSAM)